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October 18-19, 1984

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EIGHTH ANNUAL ENVIRONMENTAL REVIEW CONFERENCE

OCTOBER 18-19, 1984

PRESIDENTIAL HOTEL

4001 NORTHEAST EXPRESSWAY (I-85 at I-285)

ATLANTA, GEORGIA

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SHEPPARD NEAL MOORE

SHEPPARD NEAL MOORE has been with the U.S. Environmental Protection Agency (EPA) in Atlanta since it was organized in 1970. Prior to that time, he was with the Federal Water Pollution Control Administration (FWPCA), one of the agencies that formed EPA. He has been involved with environmental review since 1972 and is currently Chief, NEPA Review Staff. He spent two years in the Carribbean Area Office in San Juan, Puerto Rico in 1970 and 1971.

Prior to joining the FWPCA, Mr. Moore worked with the U.S. Department of Agriculture, Forest Service, Soil Conservation Service, and Extension Service. He also served on the staff of North Carolina State University (NCSU), Raleigh, N.C. for several years. The last two years with NCSU were spent in Lima, Peru where he served as Administrative Assistant and Economic Advisor to Peru.

Mr. Moore graduated from North Carolina State University in 1955 with a Bachelor of Science degree. He earned graduate degrees at NCSU and Georgia State University.

Mr. Moore is a native of New Bern, North Carolina. He, his wife Sarah, and their two children live at 3720 Club Drive, Kennesaw, Georgia.

OPENING REMARKS

SHEPPARD N. MOORE

CHIEF, ENVIRONMENTAL REVIEW SECTION

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION IV

Good morning. If you will find a seat, we will begin the Eighth Annual Environmental Review Conference. We have twenty five Federal agencies represented here today and State, and local government representatives and private citizens from sixteen states and Washington, D.C. It is rewarding to see so many of you that have attended before. In fact, Bill Dickerson, from EPA's Office of Federal Activities in Washington, was on the program of the first conference in May 1975. I also see at least three other people in the audience that were at that first conference and, if my memory serves me well, have attended each successive conference - John W. Rushing, Corps, Atlanta; Gary A. Margheim, SCS, Washington, D.C.; and David H. Densmore, FHWA, Atlanta.

As I have said many times before, I feel that these conferences have opened lines of communications, improved relationships and promoted coordination among the various federal agencies as well as between the public and private sectors on environmental issues. We are extremely fortunate again to have highly qualified speakers and workshop chairpersons and participates from both the public and private sectors. We are following our past format in having keynote speakers this morning and workshops on emerging issues this afternoon and tomorrow morning.

I urge all of you to attend the Social Hour this evening, sponsored by Saul Herner and Gene Allen. There will be the usual excellent selection of wine and cheese so I look forward to seeing you there.

At this time I would like to recognize Charles R. Jeter, Regional Administrator of EPA, Region IV. This is his third conference so he is also becoming an old hand at welcoming you to Atlanta.

Charles.

CHARLES R. JETER

CHARLES R. JETER began serving as Regional Administrator of the U.S. Environmental Protection Agency, Region IV, on July 19, 1981. As the Agency's principal official in the southeast, Mr. Jeter is responsible for enforcing the Federal government's pollution control laws in Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee.

Prior to his EPA appointment, Mr. Jeter held a number of key positions with the South Carolina Department of Health and Environmental Control. As Chief, Wastewater and Stream Quality Control, he directed the state's water pollution control program from July 1976 until July 1981. Earlier, he was Director of South Carolina's Industrial and Agricultural Wastewater Division.

Mr. Jeter is a past national president (1979-1980) of the Association of State and Interstate Water Pollution Control Administrators, and a Registered Professional Engineer in the State of South Carolina.

He graduated from Clemson University in 1963 with a Bachelor of Science degree, and earned a Master's degree in environmental engineering from Clemson in 1971.

Mr. Jeter is a native of Union, South Carolina. He and his wife, Helen, have three children.

WELCOME

CHARLES R. JETER

REGIONAL ADMINISTRATOR

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION IV

It is indeed a pleasure to welcome you to the City of Atlanta and to Region IV's Eighth Annual Environmental Review Conference. Again, I want to thank Shep Moore and his Environmental Review Staff for doing a fine job with the arrangements for this meeting. Their diligent efforts have paid off in making this conference more productive each year.

I'm very pleased that Jackie Schafer, a member of the Council on Environmental Quality, is present and will speak to us on "The Public Benefits of Private Property."

Also, I am happy that other federal agencies which are so vital to the success of the NEPA process are represented here today. The process, as you know, is one primarily involving the federal community. Let me say here that we in the Environmental Protection Agency appreciate the cooperation shown by the Secretary of the Army, the Department of Agriculture, the Department of the Interior, and others. My thanks, too, go out to those here from the academic and business community. Thanks to all of you, the NEPA process is working.

Last year, I told many of you at this same conference that EPA was working toward a number of broad objectives. Trying to improve the scientific basis upon which we make decisions and regulating in a timely manner are two of them.

I believe I can say we are doing better on both counts. We are doing our best to obtain a better scientific foundation for EPA's actions, and, of particular importance to the NEPA process, we are making every effort to act in an expeditious and timely fashion.

In closing, I want to thank our speakers and each of you for participating in what I feel will be a very worthwhile and rewarding conference. Together we can improve the NEPA process, and the environmental review process, and thereby protect the environment and our natural resources.

We appreciate your attendance. If I or my staff can assist you in any way, please call on us. Have a good meeting!

BENJAMIN C. DYSART III

BENJAMIN C. DYSART III is a professor of environmental & water resources engineering at Clemson University in Clemson, S.C. A native of Columbia, Tenn., he has been a member of the faculty at Clemson since 1968. He received his bachelor's and master's degrees in civil and sanitary engineering, respectively, from Vanderbilt University. His doctorate is from Georgia Tech where he majored in civil engineering and specialized in water resources planning, development, and management. Prior to his graduate studies, he was a staff engineer with Union Carbide Corp. for three years.

He has developed and teaches both graduate and undergraduate courses. In 1982, his contributions as a teacher and researcher were recognized by his College of Engineering peers through the McQueen Quattlebaum Faculty Achievement Award. Ben has been major advisor to over 60 master's and doctoral students at Clemson. He is also active in conducting research supported by industry and government agencies and publishing, and serves as a technical and policy-level consultant to major industries on water resources, energy, water quality, and environmental protection matters.

Until 1975, he was director of Clemson's Water Resources Engineering graduate program and a member of the Water Resources Research Institute's Directorate. He is past president of the Association of Environmental Engineering Professors, a member and past chairman of the S.C. Dept. of Health & Environmental Control's Environmental Quality Control Advisory Committee, is and was a member of the S.C. Heritage Advisory Board. In March of 1984, S.C. Gov. Dick Riley awarded Ben the Order of the Palmetto, the highest recognition that can be given to a citizen of S.C.

He has served in advisory capacities or as a consultant to a number of federal departments or agencies including NSF, Interior, Commerce, Army, TVA, Energy, and the Environmental Protection Agency. During 1975-76, he worked full-time at the policy level in Washington, serving as Science Advisor to the Assistant Secretary of the Army for Civil Works.

From 1979 to 1982, he served on the Department of the Interior's Outer Continental Shelf Advisory Board and its Scientific Committee as a Secretarial appointee. In 1983, he was named to the EPA's Science Advisory Board and its Environmental Engineering Committee by the Administrator. In March, he was re-elected to a second term as president and chairman of the Board of the 4.3-million-member National Wildlife Federation.

"SOME THOUGHTS ON IMPROVING THE ENVIRONMENTAL REVIEW PROCESS"

BENJAMIN C. DYSART III

PRESIDENT AND CHAIRMAN OF THE BOARD
NATIONAL WILDLIFE FEDERATION

Thank you Shep. I have to tell all of you that Regional Administrator Charles Jeter is one of our most distinguished Clemson environmental engineering alumni. And I say that because it's my opinion, and the opinion of others whom I respect, that he's making a real difference for the good, in a slot where the quality of the technical review and--much more important--the quality of the decision-making process is critical.

We turn out a lot of good environmental engineers with graduate degrees but very few who, first, have a real opportunity to actually have a significant impact in a major sphere of influence and, second, are able to turn such an opportunity into reality--out in the real world.

When Charles asked me to attend this meeting and speak on improving the environmental review process, I thought: "Sure, that's something that I can offer some helpful suggestions on." I must say at the outset that I don't have any answers or quick fixes or whatnot; but I do have some well-informed and thoughtful views, observations, etc.

In fact, I think I've done a fair amount already to improve E.P.A.'s environmental review process by sending some of my best graduates to E.P.A., people like Karen Klima at headquarters, Cam Warren here in Atlanta, and Ken Barry, Bill Cosgrove, and Tom Barnwell over in Athens.

Of course, I believe I also contribute to the quality of federal agencies's environmental review by sending some of my best environmental engineering graduates to the private sector. Some outstanding examples that come to mind--and not just because they're here today--are Chris Thompson with DuPont at their Savannah River Plant and Bob Edmonds with Duke Power.

An outfit like Duke Power which has, year in and year out, the most efficient coal-fired power plant in the U.S.--and the most efficient entire thermal generating system in the U.S.--is going to be pretty careful about conserving resources and doing what's responsible and good for the environment in general.

It's my opinion that all of you federal agency folks are going to have less problems in the environmental review area with a company that has a long history of environmental sensitivity and--this is very important--a management, top to bottom, that pushes wise and responsible resource use on all fronts for a lot of right reasons. I know that if more major industries conducted internal environmental audits with teeth in them like Duke does--audits dealing with the performance of air pollution controls, erosion control systems, etc.--your jobs would be a lot easier. And air and water quality problems would be fewer and less severe.

But anyway, in his invitation, Charles deftly added a little caveat that I should speak on improving the environmental review process but "within the limited resources available." Now those are words calculated to strike terror in any federal or state--or academic--bureaucrat's voice if I ever heard them.

But tight dollars seem to be the burden that environmental regulations, and regulatory agencies have been operating under for the last several years. Almost everyone has had to try to do more with less in recent times.

All of you who are regulators carry another heavy burden. As regulators, you have a credibility problem. It's tough to say how important that problem really is, especially in the eyes of the public, but it certainly is a problem on the Washington scene.

President Reagan, Vice President Bush, and many of their early appointees championed the cause of regulatory reform. Even President Carter and his appointees were sniffing around in the same general area.

Environmental regulations got caught up in a government-wide attempt to reduce unnecessary regulation, cut back on laws, slash red tape--and across the board--"make government function more efficiently." That, in and of itself, wasn't really too bad an idea at all. People who agreed that environmental regulation could--and should--be more efficient and more effective included me, Bill Ruckelshaus, and most other good, reasonable, and decent folks I know in both the public and private sectors.

The Clean Water Act, the Clean Air Act, the Endangered Species Act, and their implementing regulations were just a few of the rules caught up in the "mandate" to change the Nation's whole approach to the environment. The line between, on the one hand, environmental laws and regulations and, on the other hand, "waste, fraud, and abuse"--all the latter to be aggressively rooted out, exposed, and done away with you'll recall--became pretty blurry.

The plan was to clamp a lid on all of you faceless bureaucrats, and prevent you from influencing and hurting the economy and the personal lives of our citizens. In other words, David Stockman, the Heritage Foundation, and Jerry Falwell aimed to get you people off our backs, at least off the backs of the "good guys".

They were going to teach you federal bureaucrats how to park your bicycles straight. Somehow, I don't think the real pros I know at E.P.A. who have been around a long time like Paul Traina, Howard Zeller, and Alec Little needed anybody to tell them how to park their bicycles!

In any event though, the silk banners were unfurled, the golden trumpets sounded, and Ann Gorsuch, Jim Watt, and Bill Gianelli charged off to slay the dragons of environmental regulation and unleash the fettered genius of private enterprise, voodoo economics, and deregulation. And lucky for the American public they promptly charged right off a cliff. Sometimes unleashing is the last thing you want to do, especially if you care about an unsoiled neighborhood.

The three of them--dragon-slayers all--and what they represent are pretty muchgone from Washington, for now. And why are they gone? They're gone because the Administration misread the public and their "mandate" on the issue of the environment. They finally realized it after two or three years of euphoric de-regulation and teeth pulling, and as the '84 election replaced all other items as priorities number 1, number 2, and number 3, and it became desirable to cut some political losses and lower some profiles.

Of course, I'll freely concede that this isn't too different from the game plan for most any incumbent president, i.e., letting an election and the polls set your agenda for you.

"SOME THOUGHTS ON IMPROVING THE ENVIRONMENTAL REVIEW PROCESS"

In 1982 and 1983, poll after poll showed that the American people didn't like what President Reagan--or whoever gives the environmental orders at the White House--had ordered his dark-draped knights to do to the environment. Balance was lost in most instances to the point where, by a two-to-one margin, Americans considered that the Reagan-Gorsuch E.P.A. was "biased in favor of industries that pollute."

To correct that problem, the President got rid of his environmentally-benighted knights and many of their minions, and he replaced them with more diplomatic folks such as Bill Ruckelshaus and Bill Clark. Since then, they've been cleaning up the act and/or controlling political damage, depending mainly on your reading of the signs and the tea leaves.

It's hard to know, to be perfectly honest, how much of the new effort at E.P.A. and Interior is born-again environmentalism and how much is simple electioneering, but things have improved, certainly relative to the great dark depths things got to earlier in the Reagan Administration. I'll accept this new relative movement as relative progress toward a cleaner and healthier environment.

It's sort of like somebody's chopping off a dog's tail, and then giving "Old Spot" a piece of it back for dinner. To "Old Spot", it sure beats starving in the short run--but it's a tough way to do it. With respect to some of our Nation's environmental protection and resource management programs, the President chopped off the dog's tail right behind the flea collar.

I believe this is about as good as it's going to get, i.e., some relative progress from the lows, because no advice on substantive environmental quality issues is sought by the President. And what I'm convinced is right good advice that Bill Ruckelshaus can and does--or did--provide, has fallen on deaf ears in the Oval Office.

This is my view as an interested and informed observer and participant, and is based additionally on thoughtful and candid observations of others--in and out of government--who are close enough to the process and the principals to have direct knowledge.

You'll notice that I haven't said the new approach to improve things or patch up problems is an across-the-board move by the Administration. While Interior and E.P.A. are improving, relative to where they were, some other agencies haven't gotten the word yet. For instance, the Corps of Engineers is still out there trying to slay non-existent dragons.

In spite of the Congress and the Courts, the Corps still seems to be doing its best to destroy Section 404 from within. I think they've been working pretty hard to do that--to spike their own cannon--since at least 1975, when I went with the Secretary of the Army's office and the Corps was fanning the flames of opposition to 404.

At N.W.F. we've seen example after example from the Corps, where they refuse to do their job the way the laws and regulations require. The examples include harm to endangered species from failure to exercise 404 authority, failure to claim jurisdiction, failure to obtain the opinions of E.P.A. and Interior on individual permits, failure to apply environmentally-favorable court decisions beyond the jurisdiction of the ruling court, and failure to enforce existing settlement agreements--all of this just on Section 404.

"SOME THOUGHTS ON IMPROVING THE ENVIRONMENTAL REVIEW PROCESS"

Last Thursday, October 11th, we went back to court to sue the Corps for breach of the 404 regulations settlement agreement. They missed the manadated time frame, which was a few weeks ago; but, so far as we were concerned, that was pretty minor.

The really important problem was that they grandfathered out all projects under construction, plus all projects authorized or even under any serious contemplation. That doesn't leave nearly enough for the settlement to apply to. As we saw it, they trampled underfoot the spirit of the good-faith settlement, which many individuals in various federal agencies accused us at N.W.F. of making too "reasonable" in the original settlement negotiations.

For some reason, the Corps is very reluctant to listen to the public on wetlands protection. They--hopefully not too many of you in this room--simply aren't doing their job, and the American public is not being well served by their actions. This is most unfortunate because the American public strongly supports protection of our environment; and the Corps is absolutely capable of doing a first-rate job on any mission they're ordered to perform, if they want to do it well.

I'm very hopeful that Vald Heiberg's arrival as the new Chief of Engineers will bring a lot of improved performance. I'm sure he wants to keep his well-deserved reputation as a world-class water-walker intact, through producing superior results on tough issues where others couldn't seem to bring them into focus.

The people and parts of their government are too often at loggerheads today. And that's unfortunate and unproductive; and it leads to wasted time, money, resources, and opportunities in the environmental review area and in other areas. Let me give you just a couple of additional examples.

We see a number of seemingly strong pro-environment positions articulated by some of this Administration's agency appointees in meetings and with Members of Congress. But then when the O.M.B. letters come out expressing the thought-out "official" priorities, views, and positions of this Administration, they're often much weaker or fuzzier.

Here's another example. At the same time the Administration was attempting to review regulations affecting the private sector with an eye toward requiring benefit-cost analysis, cost effectiveness determinations, etc., these arguments were stood on their heads as they repealed the well thought out "Principles and Standards", with their uniform procedures for required benefit-cost analysis for federal bureaucrats to follow in planning federal water resources projects. This seems to suggest--and rather strongly--that the goal of all the review was less environmental protection and not simply less regulation.

Another federal environmental review problem is reminiscent of old problems. I'm referring to F.E.R.C. (Federal Energy Regulatory Commission) and their N.E.P.A. regulations on hydropower. These regulations aren't consistent with C.E.Q.'s (the President's Council on Environmental Quality) N.E.P.A. guidelines. This is a real problem, as they review hundreds of hydro projects per year.

With the so-called "small hydro boom"--stimulated by higher energy prices and the tax bills passed by Congress between 1978 and 1980, F.E.R.C. has gone from a few dozen small hydro projects to over a thousand permit applications a year. These are centered, for the most part, in New England, the Pacific Northwest, and California--the major hotspots of small hydro activity. This should be viewed as a serious problem, because this review is going on outside the context of N.E.P.A. A host of important federal agencies with major environmental review responsibilities--e.g. the National Marine Fisheries Service, the Fish and Wildlife Service, and E.P.A.--are simply out of the loop.

Unfortunately, actions like these I mentioned and others force the National Wildlife Federation to go to court. Not all differences need be settled by litigation; in fact, the fewer the better so far as I'm concerned. Certainly we don't avoid the tough situations that end up in court, but we always prefer to seek cooperation through fair-minded resolution and even-tempered dialogue.

We don't mobilize and deploy our scarce organizational resources carelessly. Litigation is a last resort; but when we go to court, we expect to win because we're very careful to be sure we're right just as often as we can. Of course our flexibility in negotiation is limited by the expectations of our membership and resolutions adopted by our voting delegates from all over America at our annual meetings.

For example, 73% of our members believe that there are too few environmental regulations; and 97% believe that the federal government should continue to restrict development that damages wetlands. More than 90% believe that Congress should require utilities to reduce sulfur emissions that form acid precipitation, even if it means increasing electric rates.

Our people--the 4.3 million members of N.W.F. and our volunteer leadership and our staff--realize there's no free lunch. And they don't want the polluters getting a "free ride", especially when we all know that society actually picks up the tab.

And polls show that our membership is right in step with the opinion of the rest of the public on questions of environmental protection. Every credible poll taken in recent years has confirmed and reconfirmed that the public's overwhelming desire is to protect the environment, to clean up the air and water, and to maintain important wildlife habitat.

The public supports you in your role as regulators and protectors of the environment. But the public--and our membership and leadership--recognizes that a clean environment and a healthy economy can and must go hand in hand. So they don't want you to be simple nay-sayers and nigglers.

Beyond that, the public obviously wants government to be efficient. And at least partly this is because it's their dollars you're spending, just like it's their environment you have a public-trust responsibility to look out for.

Please don't confuse these signals. I'm saying the public expects you to do a good job and watch what it costs, not just minimize environmental regulation cost. As tax-payers, we all want our employees to be prudent in their approach to these functions. As you can tell, I've worked my way back to that phrase: "within the limited resources available."

Everyone has some limit to their resources. Although the National Wildlife Federation is the world's largest conservation organization--with 80-some-odd-percent of all Americans who hold membership in or support conservation and environmental organizations--even we certainly have a limit to the resources we can put into any particular effort. So we can be sympathetic when an agency is under-funded and under-staffed and unable to do the kind of thorough, efficient, effective, and timely job most agency professionals would prefer.

We do our best by devoting a lot of man-years and dollars to working in the legislative arena to see that resource agencies--and the environmental review process in particular--are more adequately funded. As a footnote, I'll tell you we aren't always as successful at funding these functions as we'd like; but we'll keep trying.

In spite of the limit to our resources, National Wildlife Federation is involved in a wide range of issues. I've already mentioned wetlands--one of our top concerns--and one in which we put a lot of legislative, scientific, and legal resources.

We're very actively involved in the wetlands area for lots of good reasons, in addition to the fact that the N.W.F.'s president and Board chairman is a serious supporter of everything that's good for ducks and waterfowl hunting. We're involved with legislative efforts to fund acquisition and proper management of wetlands, the rule-making process under Section 404, and a variety of legal actions. Here in the southeast, we've established a regional office--originally funded by E.P.A. as a wetlands-resource center--that focuses much of its energies on wetlands.

We're also involved with energy development problems, surface mining regulations, acid precipitation, water project development, and a whole host of other areas.

"SOME THOUGHTS ON IMPROVING THE ENVIRONMENTAL REVIEW PROCESS"

N.W.F. works at both the federal and state levels. We work with agencies, other public-interest and conservation organizations, and the private sector.

Many of you are probably familiar with individual executives, scientists, lobbyists, and attorneys on our staff. These are really good professionals, top-flight people like Lynn Greenwalt, Norm Dean, Al Wentz, Ed Osann, Ken Kamlet, Sharon Newsome, Doug Miller, Jay Hair, and--of course--the hot-shots that help them do their good work.

Our staff is hired and retained to provide an objective, reasoned, solid technical analysis of an issue. In this way, we can base our positions on the best possible set of facts. In my opinion, if we don't have the best people around in an area on our team, then we shouldn't be playing in that particular game. Fortunately, we've got--in my typically humble opinion--some real acknowledged super-stars in their specialty areas.

As a rule, when we come to the table to discuss problems with projects, we've already devoted considerable resources in staff time and money to be sure that we have a reasonably accurate picture of the problem we're addressing. My point is that we participate in the environmental review process on a regular basis as active and informed participants.

And I think we at N.W.F. want the same thing from this process that all professionals in this field want, and that's informed environmental review that leads to sound environmentally sound and economically sound decisions. As I've already indicated, we'll do our best to work these things out in an effective, credible way without going to all the formal administrative and legal steps that are used in last-resort situations.

Let me give you an example of one of our major efforts to work things out without knocking heads. In 1982, N.W.F. formed a group that we call the "N.W.F. Corporate Conservation Council." The Council is a forum for examining issues and developing better ways to identify and deal with future problems which may arise between responsible corporate America and the responsible conservation community, and thus provide more reasonable means for arriving at workable solutions and, in general, making things better for all.

It's a goal of the Council to design constructive proposals to improve both industrial productivity and environmental quality. We hope that this approach will help minimize adversarial confrontations in the future, and that should make your jobs as regulators easier.

The Council is a meeting ground of top industrial executives and N.W.F. leaders, where we have the opportunity for frank and open discussion of items where we have a mutual interest in the wise use of natural resources. The Council also has an outreach program, where we attempt to spread the word on issues we've successfully dealt with.

Certainly we and industry don't always see totally eye-to-eye on every detail, but there's an awful lot of common ground. For its first project, our Corporate Council tackled the problem of wetlands loss, and looked at the part that industry plays in that problem--and the important part it can play in the solution.

As a first step toward helping resolve of the problem, we agreed on a "Statement of Policy and Practices for the Conservation of Wetlands." The 12 major corporations that initially signed the statement--including a couple here in the southeast--and the numerous groups that've signed since pledged to "be particularly sensitive to wetland problems, and to be attentive to these issues in the conduct of [their] businesses."

The statement isn't just fluff and window dressing. Several of the corporations have taken substantial affirmative steps to help advance the cause of wetlands conservation. And, perhaps most important, the Council is moving forward on other issues, and working with N.W.F. to solve problems before we end up in a courtroom.

Another example of a positive step that should help to solve environmental problems is Clean Sites, Inc. That's a non-profit, industry-funded organization that'll initiate clean-ups at--eventually--hundreds of abandoned hazardous waste dump sites throughout the country.

The chief executive officers of N.W.F. and the Conservation Foundation, both highly respected middle-of-the-road Washington-based conservation organizations, were members of the seven-man Steering Committee that converted the idea into phase one of a reality. We hope this cooperations will speed the process of solving a critical national problem without resorting at the beginning to the regulatory and legal systems.

I've provided these examples not just to impress you but to show you that, if we all work together from the beginning, most problems can be resolved before they become contests of brute strength. I know, as do many of you here know, that when the bull elephants go at it in the jungle, though there may be a victor, even he seldom walks away without scars.

Because of my work as an environmental and water resources engineering faculty member at Clemson University over in South numerous groups that've signed since pledged to "be particularly sensitive to wetland problems, and to be attentive to these issues in the conduct of [their] businesses."

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Because of my work as an environmental and water resources engineering faculty member at Clemson University over in South

Carolina, I speak to many groups of engineers and scientists. The story I'll tell them is very much like the one I'm telling you. The process needs to be open to all who are interested.

How can this process be improved? One good way is for you to improve the quality of public participation in agency decision making. I think I can hear the groans, and I know many of you look at greater public involvement as a big pain in the rear.

I'm not talking about pro forma public hearings--in a rented-out high school gym, presided over by zombies, and convened only to create a fat record, widely suspected of being ignored by the real decision makers. But I'll say this: if you involve the public in your decision making in the right way, in a meaningful way, and at the right times, it can be a very positive part of any project planning effort.

If you don't involve the public, then you're simply begging for the more typical reaction of static and bitter fights from the public. You'll deserve it. I hope you can understand why we're more than vexed when unnecessary problems occur in the environmental review process.

Many of these problems are a result of poor communications--simply a failure to inform citizens who are concerned with a permit or project, lack of sufficient notice time, inadequate provision of information to the public, notifying conservationists pretty much as an afterthought--or at a point in the process when it's clearly too late to be meaningfully involved, and failure to give serious consideration to the comments and concerns of thoughtful citizens. These communication problems are unfortunate, since they often lead to bigger problems and long-term problems.

"SOME THOUGHTS ON IMPROVING THE ENVIRONMENTAL REVIEW PROCESS"

Our major concern is simply that inadequate environmental review results in an inferior environmental product. Failures in communication cause stresses between participants in the process, and that further compounds the problem. There are other problems in the process, such as within agencies and among agencies.

I'm sure every person here today can think of examples of problems that have cropped up in the review of projects or other environmental reviews. I know I've seen more than my share--as a technical consultant to industry, as a member of the South Carolina Environmental Quality Control Advisory Committee, as a Board member of my South Carolina Wildlife Federation, as president of N.W.F., as a member of E.P.A.'s Science Advisory Board, and back when I was a member of the O.C.S. Board and science advisor to the Assistant Secretary of the Army for Civil Works.

But let's not be negative about this effort. Certainly we can all find reasons why our reviews have failed--or simply been inadequate--but that sure doesn't get us anywhere. Every person in this room today knows ways to improve the environmental review process, and this is true even if you don't realize you know ways to improve the system.

Stop and think: how many times have you seen a process go astray when a little better planning, better communication, or some other minor--or major--change could have produced a better, more environmentally sound review process?

As I wind up, I'm going to issue a challenge to you. I challenge each of you here, first, to identify one mechanism to improve the environmental review process and, second, to advocate that change at this meeting. I further challenge each of you to attempt to implement that new mechanism--plus one other that you hear about at this meeting--over the next year.

For you administrators in the audience, I give you a special challenge, beyond the conception of one idea. I challenge all of you administrators to listen seriously to all these other ideas, throw away your stock reasons why the ideas won't work, and then do your best to make them work.

No one is in a better position to put forth those new ideas than you who are here today. If you'll accept this challenge, then perhaps next year you can return to this meeting and talk about some really significant and exciting accomplishments.

I'm convinced that the American public is ill-served by unnecessary adversarial approaches to complex environmental issues. Certainly there'll always be cases where no other approach will serve the public good so well as a well-won court action or two. But, in most cases, a reasonable approach to the environmental review process will negate the need for such harsh follow-up action.

I encourage you--in your roles as regulators and protectors of the environment, as leaders of citizens groups, and as managers in the private sector with environmental responsibilities--to take the steps to make environmental decision making a better process. It'll pay handsome dividends for all of us, the Nation, and our environment.

Good people pulling together--good public- and private-sector people, involved early enough in the process--can make the environmental review process better and produce good results without a lot of wasted resources in the review process.

In closing, I'd like to thank you for inviting me and N.W.F. to be a part of your conference this year. You have a fine program, lots of knowledgeable and stimulating speakers, and some very good workshops topics. I commend E.P.A. Region IV, Shep Moore, Charles Jeter, and everyone who has been involved in putting this conference together. I believe it's going to be beneficial to all of us who are fortunate enough to be invited to be here and be a part of it.

JACQUELINE E. SCHAFER

JACQUELINE E. SCHAFER was appointed by President Reagan to be a Member of the Council on Environmental Quality on May 25, 1984. Her nomination was confirmed unanimously by the United States Senate. Members of the Council serve at the pleasure of the President.

Miss Schafer joined the Council after serving as Regional Administrator of the U.S. Environmental Protection Agency, Region II, in New York City. Region II includes New York, New Jersey, Puerto Rico, and the U.S. Virgin Islands. As Regional Administrator since March 1982, Miss Schafer managed a yearly operating budget of $20 million to support 500 employees, including environmental scientists and engineers, inspectors, and attorneys. The Region also awarded $25 million annually for state-delegated environmental programs and made construction grants to municipalities from a $410 million annual allotment for wastewater treatment facilities. Nearly one-fourth of the hazardous waste sites on the "Superfund" National Priorities List is located in Region II.

Miss Schafer began her career in environmental policy as a Legislative Assistant to U.S. Senator James L. Buckley of New York from 1971 through 1976. During that time, Senator Buckley served as a member of three Senate Committees responsible for writing nearly all of the Nation's federal environmental protection statutes: Environment and Public Works, Interior and Insular Affairs, and Commerce Committees. From 1977 to 1982, Miss Schafer served as a Professional Staff Member to the U.S. Senate Committee on Environment and Public Works, under the Chairmanship of Senator Robert T. Stafford of Vermont, where she was responsible for assisting the Republican Members in the development and oversight of environmental protection and economic development policy and laws. In these capacities she has contributed to a wide range of environmental legislation, most particularly the Clean Water Act, the Safe Drinking Water Act, the Marine Protection, Research and Sanctuaries Act (ocean dumping title), and the National Environmental Policy Act.

Miss Schafer was born in Greenport, New York, and grew up in New York, New Jersey, and Connecticut. She holds an A.B. in Economics (1967) from Middlebury College, Middlebury, Vermont. Before Senator Buckley's election in 1970, Miss Schafer worked on his campaign in New York City and handled all environmental issues for him. From 1967 to 1970, she was an analyst in the banking studies department and a research assistant in the research department of the Federal Reserve Bank of New York.

Miss Schafer now resides in Washington, D.C.

Ms. Schafer's address, "Exploring the Public Benefits of Private Property," was unavailable at printing time.

JOSEPHINE S. COOPER

JOSEPHINE S. COOPER was nominated by President Reagan to become the first Assistant Administrator for EPA's Office of External Affairs. She was confirmed unanimously by the Senate on October 7, 1983, and was sworn in on October 13, 1983.

In this position, Ms. Cooper is responsible for Agency liaison with the Congress, the public, press, other federal agencies, states, environmental, union and industry groups. In addition, she administers EPA's 404 Dredge and Fill program and serves as the National Program Manager for implementation of the National Environmental Policy Act and the Federal Facilities Compliance Program.

At the time she was appointed to her current position, Ms. Cooper worked in the capacity of professional staff on the Committee on Environment and Public Works. In this capacity, she developed amendments and new initiatives in hazardous waste legislation, including Superfund and Resources Conservation and Recovery Act (RCRA). Her other responsibilities included authorization of the environmental research and development program and provision of counsel to Senator Howard Baker on all committee issues, including Clean Air Act, Clean Water Act, Tennessee Valley Authority, and fish and wildlife activities.

From 1968 until 1981, Ms. Cooper served in various capacities at EPA. Her responsibilities covered a wide variety of environmental issues and her experience includes coordination of program planning and budget for research related to hazardous waste, drinking water and groundwater, development of Agency policy on population exposure to environmental contaminants, preparation of health assessment documents on antimony and zinc, development of ambient air quality standard for lead, development of Agency model for environmental impact analysis of regulatory actions, and evaluation of transportation control strategies.

She left the Agency in 1979 to spend a year as an American Political Science Association Congressional Fellow working as a Legislative Assistant to Senator Howard Baker of Tennessee and Congressman Dick Cheney of Wyoming.

During her career in the Federal government, Ms. Cooper has received numerous awards for outstanding performance, including a Bronze Medal for Commendable Service in 1978.

Ms. Cooper earned a Master of Science Degree in management from Duke University and graduated Cum Laude from Meredith College in 1967 with a Bachelor of Arts in Business and Economics.

Ms. Cooper is a native of Raleigh, North Carolina and currently resides in Alexandria, Virginia.

Revisions to the EPA Environmental Review Process

Introductory Remarks
By: Jo Cooper

It's a real pleasure for me to be here and to be able to participate in this conference. I firmly believe that every step we can take to improve communications between agencies, such as conferences like this, will have a positive influence on improving federal decisionmaking. I think all of our agencies are linked together to one degree or another and that we can benefit from sharing relevant expertise.

It's been less than a year since my office, the Office of External Affairs (OEA) was formed so we are still in the process of letting people know what the new organization looks like and what we are all about.

Figure 1 shows the organizational structure of OEA. The four offices that make up OEA consist of:

- The Office of Federal Activities
- The Office of Public Affairs
- The Office of Intergovernmental Liaison
- The Office of Congressional Liaison

As the name implies, the thing that binds all these offices together is the need for effective communication between EPA and the rest of the world. Within this context, the immediate goals of the Office of External Affairs are the following: (1) to restore credibility and the public's faith in EPA; (2) to improve Agency effectiveness in its dealings with Congress; (3) to establish sincere and effective outreach programs through State and local government contacts, public interest groups; (4) to encourage broader citizen participation in the decisionmaking process; and (5) to coordinate and strengthen contacts with other Federal agencies.

ASSISTANT ADMINISTRATOR

FOR

EXTERNAL AFFAIRS

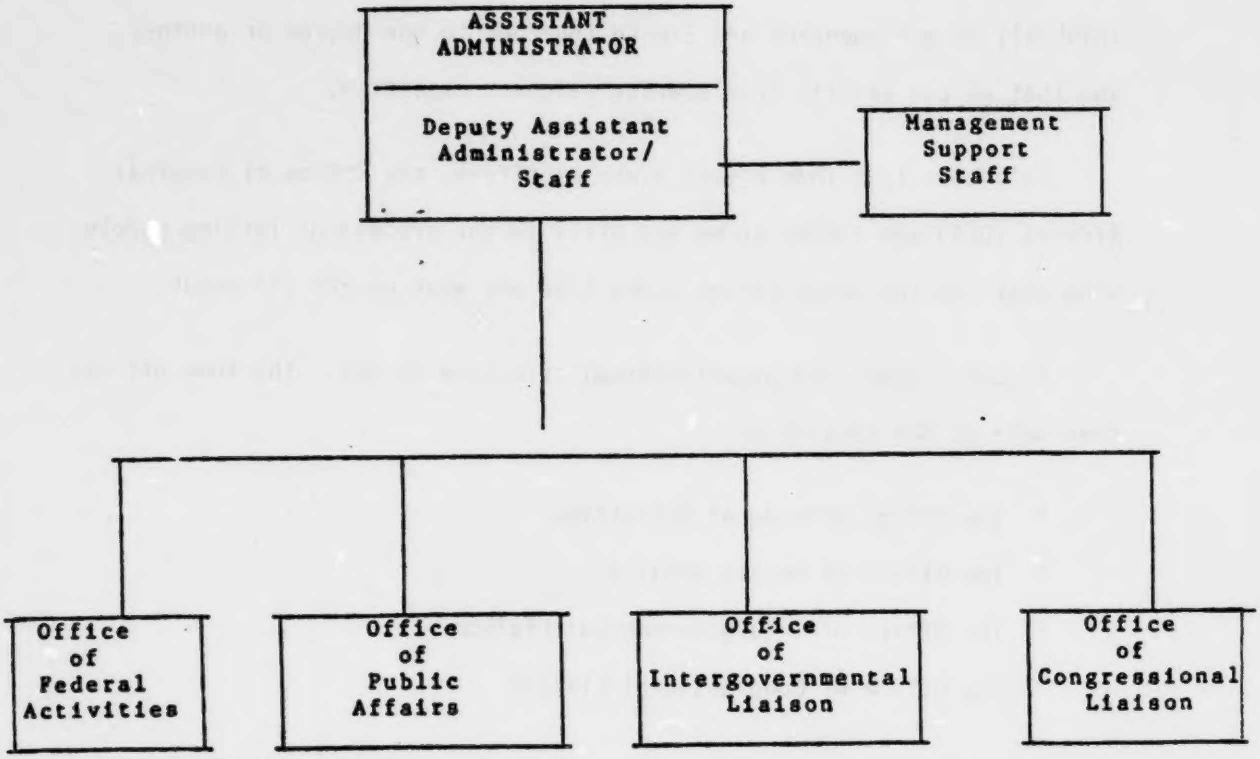
ASSISTANT ADMINISTRATOR
Deputy Assistant Administrator/ Staff
Management Support Staff
Office of Federal Activities
Office of Public Affairs
Office of Intergovernmental Liaison
Office of Congressional Liaison

Figure 1

These goals are especially relevant in the NEPA area where the basic idea is to coordinate proposals for major Federal actions with all relevant agencies. Within OEA, the oversight responsibility for both the EPA preparation of NEPA documents and the review of other agency's NEPA documents is within the Office of Federal Activities (OFA). Dr. Allan Hirsch, a long time Federal employee with wide EPA experience, as well as experience at other Federal Agencies is the Director of that office. Figure 2 shows the OFA organizational structure.

OFA manages four major programs: Federal Facilities Compliance, 404 Dredge and Fill, and NEPA Compliance, and 309 Review.

- The Federal Facilities Compliance program provides a mechanism for EPA to assist Federal agencies with budgeting, building and operating pollution control equipment to achieve compliance with environmental requirements.
- The 404 Dredge and Fill program provides a mechanism for EPA to coordinate activities with the U.S. Army Corps of Engineers. The thrust of this jointly administered program is to regulate discharges of dredged and fill material in U.S. waters in an environmentally sound manner, and assist States in assuming the Corps program.
- The NEPA compliance program ensures that EPA encorporates multi-media environmental considerations into our Federally related actions, including municipal construction grants and New Source National Pollutant Discharge Elimination System permitting.

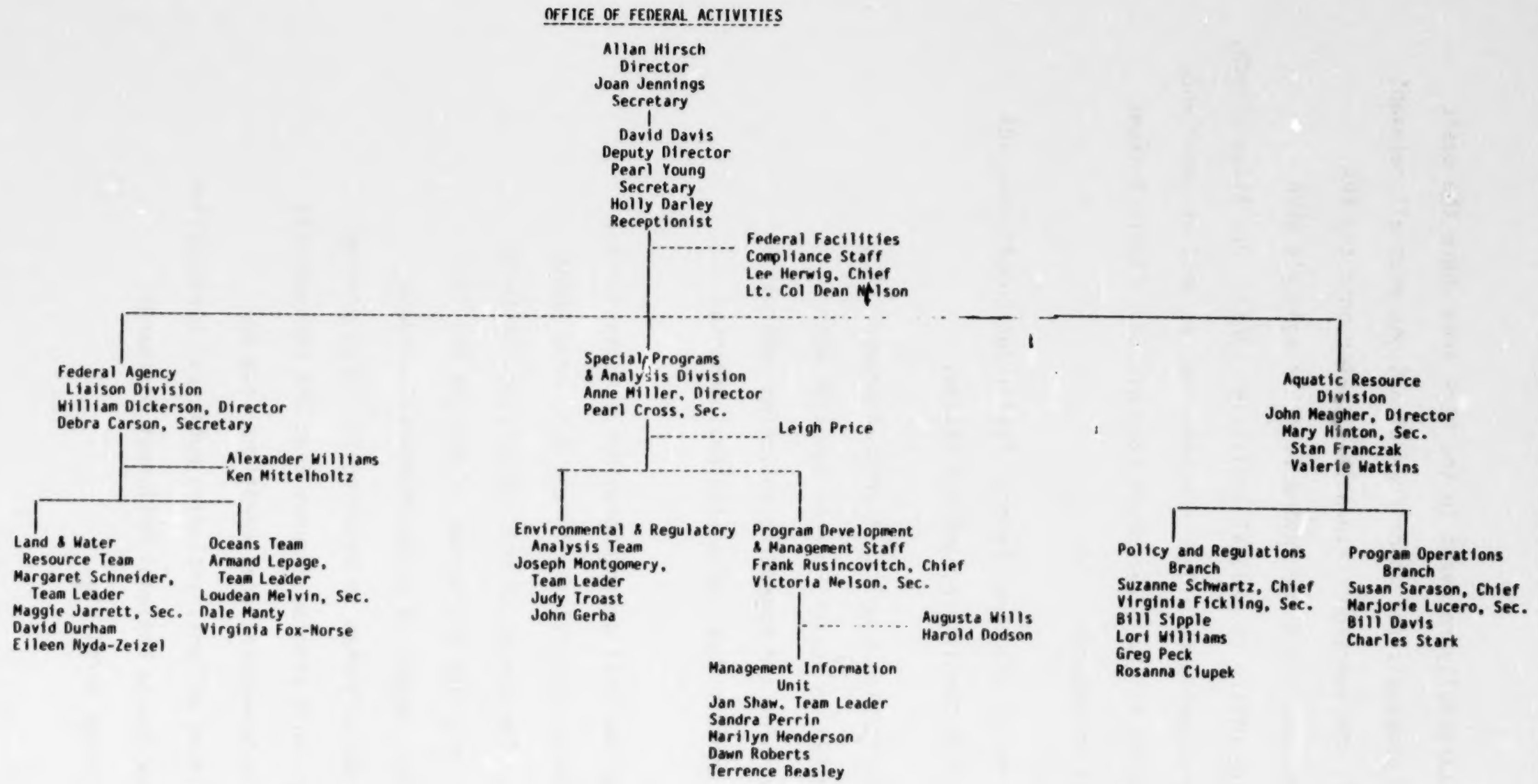
OFFICE OF FEDERAL ACTIVITIES
Allan Hirsch
Director
Joan Jennings
Secretary
David Davis
Deputy Director
Pearl Young
Secretary
Holly Darley
Receptionist
Federal Facilities
Compliance Staff
Lee Herwig, Chief
Lt. Col Dean Nelson
Federal Agency
Liaison Division
William Dickerson, Director
Debra Carson, Secretary
Alexander Williams
Ken Mittelholtz
Land & Water
Resource Team
Margaret Schneider,
Team Leader
Maggie Jarrett, Sec.
David Durham
Eileen Nyda-Zeizel
Oceans Team
Armand Lepage,
Team Leader
Loudean Melvin, Sec.
Dale Manty
Virginia Fox-Norse
Special Programs
& Analysis Division
Anne Miller, Director
Pearl Cross, Sec.
Leigh Price
Environmental & Regulatory
Analysis Team
Joseph Montgomery,
Team Leader
Judy Troast
John Gerba
Program Development
& Management Staff
Frank Rusincovitch, Chief
Victoria Nelson, Sec.
Augusta Wills
Harold Dodson
Management Information
Unit
Jan Shaw, Team Leader
Sandra Perrin
Marilyn Henderson
Dawn Roberts
Terrence Beasley
Aquatic Resource
Division
John Meagher, Director
Mary Hinton, Sec.
Stan Franczak
Valerie Watkins
Policy and Regulations
Branch
Suzanne Schwartz, Chief
Virginia Fickling, Sec.
Bill Sipple
Lori Williams
Greg Peck
Rosanna Ciupek
Program Operations
Branch
Susan Sarason, Chief
Marjorie Lucero, Sec.
Bill Davis
Charles Stark

Figure 2

- Section 309 of the Clean Air Act (the "309 review process") requires EPA to review and comment on actions taken by Federal agencies. This process, which is the subject of this conference, allows us to work with Federal agencies to ensure that their planned actions are environmentally sound and consistent with EPA regulatory responsibilities.

As you all know, EPA is heavily involved in the overall NEPA process through our responsibility to review and comment on all major Federal actions effecting the environment. We have recently revised our internal procedures for this process and have added a significant emphasis on coordination with other federal agencys'. In general, we are trying to strengthen coordination in three areas:

- Communications with other agencys - that is, a better working relationship between agencys at both the staff and political levels. I think this is a key step in working out misunderstandings without a public shoot out.
- Consistency and predictability in our review actions - we want lead agencys to clearly understand what our position is and what we intend to do about it.
- Follow-up - we intend to meet with lead agencys, at whatever level is necessary, to discuss all draft EIS comments where we have identified significant environmental problems with the proposed action.

Bill Dickerson will be going into more detail on these changes to our procedures in just a minute. To set the stage for what he will be describing and to reinforce your understanding of the EPA commitment to improving coordination, I would like to state my personal commitment to working with Federal agencies both from the standpoint of general coordination of our activities and of working out problems on specific issues. I hope you all are also willing to work harder at improving communication - otherwise it won't work.

Again, I'm pleased to be here and look forward to talking to you over the next several days.

WILLIAM D. DICKERSON

WILLIAM D. DICKERSON's Division acts as the national program manager for carrying out EPA's responsibility to review and comment on proposed major Federal actions. This responsibility includes development of national policy and guidance for the oversight procedures for the review process, carrying out liaison activities with Headquarters offices of other Federal Agencies, and managing the review of proposed national level Federal actions and proposed environmental regulations.

Mr. Dickerson has been with EPA since 1972 and has worked extensively in the area of environmental review procedures within the NEPA context. Prior to 1972, Mr. Dickerson worked for TRW System, Incorporated, where he developed, under contract to EPA, the Air Quality Display Model and assisted EPA in developing several State Air Implementation Plans.

Mr. Dickerson earned a Master of Science degree from the University of Washington and Bachelor of Science degree from Kansas State University. He has also done graduate work in Mathematics and optimization theory.

Mr. Dickerson is a native of Wichita, Kansas, and currently resides in Silver Spring, Maryland.

Current Revisions to the EPA Environmental Review Process

By: William D. Dickerson

For those of you that have been in the EIS game for any length of time, you are aware that EPA has the responsibility to, and in fact does, review and comment on all Federal EIS's. We have been doing this since 1970 when Section 309 was added to the Clean Air Act. That was a banner year for us because NEPA, EPA, and Section 309 of the CAA were all created at that time. Since then we have been playing hop-skotch with CEQ in developing guidance for carrying out EPA's part of the NEPA bargin with Federal agencies.

Figure 1 shows the evolution of the both CEQ regulations and the EPA procedures for implementing the CAA Section 309 requirements. Several specific points are especially worth noting in Figure 1. First, the EPA notion of "rating" impact statements was first introduced in our 1972 guidance. Although the rating system has changed somewhat since then it seems to be "institionalized" at this point and, on balance, has been helpful in carrying out the review process. We intend to keep on using it and have, we think, strengthened it in the latest revision to our guidelines. The 1977 CEQ/EPA Memorandum of Understanding (MOU) transferred the responsibility for managing the filing of Federal EIS's from CEQ to EPA. While this did not directly effect EPA's review function, it has resulted in a closer and more productive liaison relationship with a number of agencies. Finally, Figure 1 shows that the current revision of our review guidance was completed October 1, 1983. Since this guidance document will set the framework for future EPA reviews, I would like to describe the priority actions set out in this document and the revisions to the rating system which, we hope, will assist in implementing those priority actions. I think it is important for you to know what to expect from us and what we are trying to accomplish.

NEPA/CEQ/EPA EVOLUTION

NEPA	- established the Council on Environmental Quality and the requirements for all Federal agencies to prepare EIS's for all major Federal actions significantly impacting the environment.	JANUARY 1, 1970
EPA	- created by an Executive Reorganization Plan designed to consolidate a number of Federal environmental responsibilities into a single agency.	DECEMBER 2, 1970
SECTION 309 (of the Clean Air Act)	- requires the Administrator of EPA to review and comment in writing on the environmental impact of any legislation, regulations, project or other major Federal action proposed by another Federal agency.	DECEMBER 31, 1970
CEQ GUIDANCE	- for carrying out the requirements of NEPA was issued.	APRIL, 1973 (revised) August 1973
309 GUIDANCE	- for carrying out EPA's environmental review responsibilities was issued.	1972
309 MANUAL	- formally establishing EPA's procedures for carrying out its environmental review responsibilities was published.	MARCH 1, 1975
CEQ/EPA MOA	- transferring the responsibility for operation of the CEQ EIS filing system over to EPA was signed.	DECEMBER, 1977
CEQ REGULATIONS	- promulgated to implement the NEPA review requirements consistently throughout the Federal agencies.	NOVEMBER 29, 1978
CEQ GUIDANCE (SCOPING)	- published to further define the scoping process and Federal agencies' responsibilities to participate in this process.	1981
CEQ GUIDANCE (40 MOST ASKED QUESTIONS)	- published to provide answers to commonly asked questions regarding the CEQ Regs and administration of the NEPA process.	MARCH, 1981
309 MANUAL REVISED	- was conducted in order to: place EPA's environmental review emphasis on project impacts rather than adequacy of information; further decentralize EPA's review to the Regional level; increase early interagency coordination; and revise the rating system to provide flexibility in assigning of ratings that do not quite reach the level of potential referral.	OCTOBER, 1984

Figure 1

For the record, the complete title and reference to our guidance manual is Policy and Procedures for the Review of Federal Actions Impacting the Environment, U.S. Environmental Protection Agency, Office of External Affairs, Office of Federal Activities, Washington, D.C. 20460. Copies are available at this conference or may be obtained from any EPA Region Office. If all else fails you can get a copy from the Office of Federal Activities in Washington, D.C. (phone (202) 382-5053).

Section 309 of the Clean Air Act requires the EPA Administrator to do two things: First, he must review and comment in writing on the environmental impact of any matter relating to the duties and responsibilities of the Administrator. EPA carries this out by reviewing all EIS's, numerous environmental assessments on major projects and all significant environmentally oriented regulations. Second, if the Administrator finds the action "Environmentally Unsatisfactory" the act says he shall refer the matter to the Council on Environmental Quality (CEQ). The significance of this subsection is that it requires EPA to make a judgment on the acceptability of the level of impacts expected.

It was this requirement by the way that lead to the EPA rating system whereby we characterize the level of concern with potential project impacts. Since we had to look at the impacts from the project anyway, it seemed to us that we should be able to advise lead agencies of the degree of concern we had with a proposed project, even if our concerns would not lead to a referral to the CEQ. To us this was in keeping with the spirit of both NEPA and Section 309 to provide constructive input to the proposing agency. In fact, the CEQ regulations now state that the commenting agencies " . . . may address either the adequacy of the statement or the merits of the alternatives discussed or both."

The idea of "constructive input" to the lead agency has been a driving force in our latest guidance revision. We recognize that the lead agency is the decisionmaker and the EPA role is one of sharing expertise and advice on development of environmentally sound projects. In restructuring the 309 review process to carry out the goal of constructive input, we have concentrated on the following five priority areas:

1. Early Substantive Involvement with Lead Agencies. Everyone recognizes that the earlier you get involved in the design of a project, the more chance you have in impacting the outcome. On a general level the 309 guidance emphasizes improved liaison with action agencies. The basic purpose here is to establish a better working relationship with other agencies and, in course of that, to obtain early warning of new actions, especially those that could benefit from EPA input. On a project specific basis, we are trying to increase our participation in formal coordination through scoping and, when the project size or scope warrants it, by acting as a cooperating agency. However, because early coordination is resource intensive, in terms of staff time and travel dollars, we will have to prioritize cases for early involvement and will, to the extent possible, maximum input through phone calls, letters, electronic mail and combined meeting situations.

2. Concentration on Identification and Correction of Project Impacts. Although it is impossible to completely separate the review of the adequacy of an EIS from the determination of potential impacts, the concept here is that to be constructive and save resources, the EPA review must be oriented towards identification and suggested resolution of potential environmental impacts rather than a general review of the "completeness" of the document. According to this concept, EPA requests for additional data or analyses will be related to and be commensurate with the degree

of concern we have with the associated potential impact. We will no longer be asking for further analysis on projects with which we have no environmental concerns.

3. Consistency in Comments throughout the Process. EPA is sensitive to the "moving target" syndrome whereby a lead agency is asked to fix one thing at a time. The new guidance states that "Except in an usual circumstance, the scope of review . . . [on Final EIS's] . . . will be limited to issues raised on the draft EIS that have not been resolved in the final EIS, and any new, potentially significant impacts that have been identified as a result of information made available after publication of the draft EIS." This concept applies to all situations where previous EPA comments are on record. Being human, we may sometimes miss issues the first time around which need to be brought up on subsequent reviews. In those cases, however, the "no surprise" rule applies and the EPA reviewer will contact the lead agency before sending a comment letter with new issues.

4. Advanced Warning to Lead Agency of Significant EPA Concerns with the Proposed Projects. This is the "no surprise" rule alluded to before. The basic idea here is that we want the lead agency to know what we intend to do and to have a chance to discuss the more significant (and probably controversial) issues before we send our "official" letter. This advance warning can be either by phone or by meeting depending on the degree of concerns raised. How we intend to carry out this concept is described in detail later on within the context of the rating system.

5. Predictable Follow-up with Lead Agency Where EPA has Significant Concerns. The new procedures includes specific guidance which links the rating of a project to the follow-up required by the EPA reviewer. These are

minimum requirements and, hopefully, there will be more follow-up and coordination in general than is called for here. The object of formalizing this requirement is to let everyone know that if EPA has real heartburn with a project, we intend to follow through to try to resolve the issue (including escalation to the Headquarters levels if necessary). This concept is also explained in detail later, again within the context of the rating system.

It is our hope that full implementation of these five priority areas will produce a better interagency relationship and, in the end, better projects with less controversy and, therefore less wasted energy on the process.

As I stated before, we view the rating system as the key implementing tool for numerous parts of the EPA review process. Although we don't want to overplay the significance of the alpha numeric rating over the written descriptions of our comments, you should be aware that the rating is a synthesis of our overall concern and will result in a number of subsequent actions.

The EPA rating system has been revised with two thoughts in mind. First, we wanted to give a better definition to the rating categories and their application. The "old" system had three project ratings. They were Lack of Objections (LO), Environmental Reservations (ER) and Environmentally Unsatisfactory (EU). We found that the ER category was too broad and did not always accurately reflect EPA's level of concern. We have, therefore divided the ER category into two categories; Environmental Concerns (EC) and Environmental Objections (EO). Second, we wanted to link the adequacy rating to the project rating and link the overall rating to a requirement for follow-up coordination. In this may we hope the rating system will be "action" forcing.

Figure 2 shows a schematic of the old and revised rating systems. This depicts the range of impacts now covered after dividing the old "ER" category into "EC" and "EO" category and making the "3" category more stringent. The definitions of the new rating categories are shown in Figure 3. Instead of reading these descriptions verbatim, I will just describe the important differences between the old and revised system.

1. If EPA has no environmental objections to a project (LO rating) no document adequacy rating will be assigned and no substantive revision will be requested.

2. The old "ER, Environmental Reservation" category has been divided into "EC, Environmental Concerns," and "EO, Environmental Objections." The "EC" rating means that no "significant" potential impacts have been identified by EPA but the level of impacts could be reduced by application of mitigation measures or minor project modifications. The "EO" rating means that EPA believes the proposed action will have significant environmental impacts and should, therefore, be modified.

3. If an "EO" rating is given, the EPA reviewer will inform the proposing agency prior to sending the letter that EPA has significant problems with the project. After the letter is received the EPA reviewing office is required to try and meet with the action agency to work out the problems. If the EPA reviewing office continues to have significant project concerns after meeting with the action agency, EPA headquarters officials may become involved to assist in resolving the issue at the Headquarters level of the action agency.

EPA RATING SYSTEM

```
          PROJECT                          EIS

      NEW          OLD              NEW          OLD

            --|--                         --|--
      EU      |    EU                3      |    3
            --|                           --|
              |--                           |--
      EO      |                             |
              |                             |
            --|                             |
              |    ER                2      |    2
      EC      |                             |
              |                             |
            --|--                         --|--
              |                             |
      LO      |    LO                1      |    1
              |                             |
              |                             |
            --|--                         --|--
```

Figure 2

SUMMARY OF RATING DEFINITIONS
AND FOLLOW-UP ACTION*

Environmental Impact of the Action

LO--Lack of Objections
The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC--Environmental Concerns
The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO--Environmental Objections
The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alterna tive or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU--Environmentally Unsatisfactory
The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1--Adequate
EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2--Insufficient Information
The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3--Inadequate
EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

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*From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment.

Figure 3

4. If an "EU" rating is assigned to the project the EPA reviewing office must meet with action agency prior to sending the letter. The purpose of such a meeting is to insure a mutual understanding of the issues and concerns. In addition to the "no surprise" aspect of this policy, it ensures that the EPA facts are correct before EPA goes public with critical comments. In addition, it is useful for EPA to know of any ongoing actions that might resolve the EPA concerns. If such actions are underway the EPA may add this information to the letter. It is important to note, however, that the comment letter itself and the assigned rating are not subject to negotiation and will not be changed on the basis of the meeting unless errors are discovered in EPA's understanding of the issues.

5. The "2" rating cannot be assigned (that is additional data should not be requested) unless project impacts have been identified. (An assigned rating of "EC" or greater.)

6. The "3" rating has been changed to mean that it is EPA's belief that there are such serious problems with the DEIS that it should be revised and resubmitted for comment. The "3" rating cannot be assigned unless the reviewing official believes that the proposed project will result in significant environmental impacts. In general, this means an "EO" or "EU" rating will also be assigned. If, however, an apparently important analysis is so deficient that no conclusions on project impacts can be made, the "3" rating can be used by itself.

Figure 4 shows the possible combination of project input and document adequacy ratings and the type of follow-up that is required for a given rating. Again these are minimum coordination requirements. Our hope is that improved liaison will make such coordination a matter of course.

That covers the major initiatives we are taking to improve our contribution to improving the NEPA based project design process. But I want to leave you with the thought that coordination is a two way street -- we all need to work at improving the information exchanges and coordination between our agencies. We just completed a study of the 50 most recent ER, EU, and 3 rated draft EIS's. We looked at the final EIS's related to these drafts to see how our comments were responded to. Figure 5 shows the results of that study. We found that about 62% of our specific comments resulted in "no change" to the EIS. The final EIS in these cases either ignored our comments or referred us back to existing text! My conclusion is that either we didn't know that we were talking about, didn't say it well, or the lead agency's were stonewalling us. In any case 62% of this type of review effort is to much energy to waste. We are pledged to tighten up our act and are asking you to loosen up the stonewalls.

Thank you

RATING COMBINATIONS/FOLLOW-UP

CATEGORY	LEAD AGENCY PRE-NOTIFICATION	FOLLOW-UP ON DRAFT EIS COMMENT LETTER
LO	NONE	NONE
EC-1, EC-2	NONE	PHONE CALL
EO-1, EO-2	PHONE CALL	MEETING
EU-1, EU-2, EU-3, 3 EO-3	MEETING	MEETING

PURPOSE OF MEETING

- TO DESCRIBE THE SPECIFIC EPA CONCERNS AND DISCUSS WAYS TO RESOLVE THOSE CONCERNS.
- TO ENSURE THAT THE EPA REVIEW HAS CORRECTLY INTERPRETED THE PROPOSAL AND SUPPORTING INFORMATION.
- TO BECOME AWARE OF ANY ONGOING LEAD AGENCY ACTIONS THAT MIGHT RESOLVE THE EPA CONCERNS.

CONDITIONS OF MEETING

- THE EPA COMMENT LETTER ITSELF AND THE ASSIGNED RATING ARE NOT SUBJECT TO NEGOTIATION AND SHOULD NOT BE CHANGED ON THE BASIS OF THE MEETING UNLESS ERRORS ARE DISCOVERED IN EPA'S UNDERSTANDING OF THE ISSUES.
- EPA MAY ADD IN THE LETTER AN ACKNOWLEDGMENT OF ANY RELEVANT NEW LEAD AGENCY ACTIVITIES THAT COULD RESOLVE THE EPA CONCERNS.

Figure 4

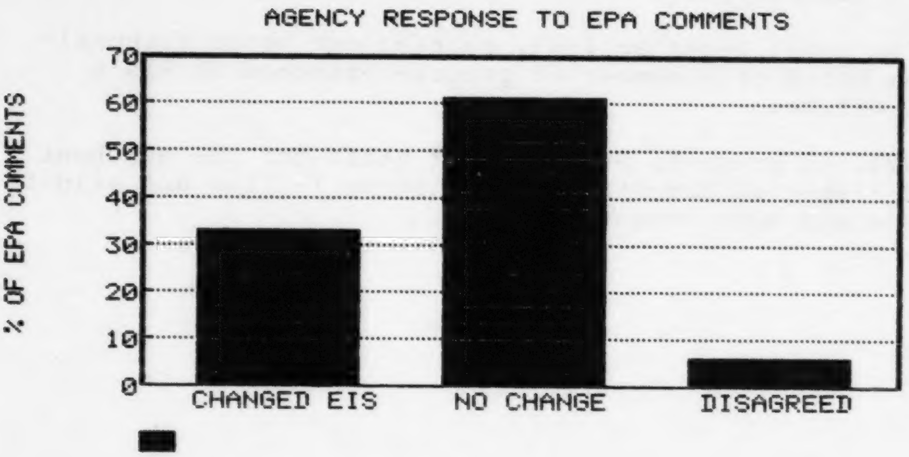
AGENCY RESPONSE TO EPA COMMENTS
% OF EPA COMMENTS
70
60
50
40
30
20
10
0
CHANGED EIS
NO CHANGE
DISAGREED

Figure 5

GEORGE D. PENCE

Born, April 9, 1940, Fort Bragg, North Carolina

Bachelor of Science in Civil Engineering from Carnegie Institute of Technology, June 1962.

Master of Science and Environmental Engineering from Rutgers, the State University, June 1963.

Commissioned Officer in the U.S. Public Health Service from 1963 until 1966; converted to Civil Service and transferred into EPA on its inception in 1970.

August 1971, until December 1982, carried out broad responsibilities as Chief of a number of program branches in EPA's Region III Office.

January 1983, to present, Professional Staff for the Merchant Marine and Fisheries Committee specializing in fish and wildife conservation and environmental issues.

HOUSE ACTIVITIES THAT MAY IMPACT ENVIRONMENTAL REVIEW By George D. Pence

Good Morning, Ladies and Gentlemen. I am pleased to be here for the Eighth Annual Environmental Review Conference.

I must admit that one week ago I feared that the studied and deliberate pace of the Congress would preclude my attendance, but the siren song of election year campaigning won out and the 98th Congress ended last Friday.

I would like to take this opportunity to review for you past and potential legislation within the jurisdiction of the Merchant Marine and Fisheries Committee which may impact on the environmental review process.

NATIONAL ENVIRONMENTAL POLICY ACT

First, the core legislation for environmental review in the United States is embodied in the National Environmental Policy Act (NEPA) first passed in 1969 and its companion, the Environmental Quality Improvement Act. NEPA contains a permanent authorization of $1 million per year and therefore is not subject to scheduled periodic review by the Congress. The Environmental Quality Improvement Act, however, was reauthorized at the end of this past session of Congress for Fiscal Years 1985 and 1986, at a level of $480,000 per year, to provide for the professional and administrative staff and support for the Council on Environmental Quality (CEQ). Combined with the $1 million per year contained in NEPA, a total of almost $1.5 million would be available, if appropriated, which we believe to be a reasonable level of funding given the past history of appropriations.

CEQ continues to be the subject of ambivalent feelings in the Congress, and apparently in the Administration as well. As is typical of many of our environmental programs, there are strong detractors and strong supporters -- and relatively few who hold a middle ground position. In the past Congress, the detractors of CEQ once again prevailed in the appropriations process -- providing only $750,000 for Fiscal Year 1985 to carry out their missions. This was despite an effort, contained in the amendments to the Environmental Quality Improvement Act, to address some of the criticisms which have been leveled regarding the lack of control over study and program funding. The Act establishes a management fund, subject to regulations, which would provide the necessary accountability to both OMB and the Congress.

However, I do not see, because of the existing ambivalence, any attempt to either weaken or strengthen the statutory authorities of NEPA. There is concern on both sides that if attempts were made to amend the basic Act, the results might be unsatisfactory. Those who would seek to weaken NEPA fear that the proponents could, in fact, strengthen it in some way and vice versa.

In general, I believe that CEQ's most recent set of regulations and the guidelines have gone a long way towards making the process work more efficiently and more fairly, and have served to lower the level of concern in both camps.

That is not to say, however, that no attention is being paid to the operations and policies of the Council. Of particular concern is the development of reasonable and workable worstcase analysis methodologies -- which is the subject of the workshop today chaired by Dinah Bear -- and the ongoing development of risk assessment procedures.

COASTAL BARRIER RESOURCES

The Coastal Barrier Resources Act, affectionately known as COBRA, passed in 1982 with the intent to discourage development of designated coastal barrier islands on the Atlantic and Gulf coasts by restricting future federal expenditures and financial assistance. In the coming year, the Secretary of the Interior is required to prepare, and submit to Congress, a report which will include recommendations for the conservation of fish, wildlife, and other natural resources of the system; recommendations for additions to, or deletions from, the System; and an analysis of the effect, if any, that general revenue sharing grants have had on undeveloped coastal barriers. I have not had the pleasure of working on this legislation yet but it promises to be extremely interesting.

Interior will have a number of recommendations for additions to the system and there are, understandably, a number of proposals for deletion by those who have specific development projects in mind.

The Legislation originally resulted from a rather peculiar coalition of liberal environmental interest groups and conservatives interested in fiscal responsibility. It is unclear at this time how these interest groups will interact in the coming year.

The period of implementation of this Act has been insufficient to obtain an accurate assessment of its impacts. However, it is clear that development of protected coastal barriers has slowed down, especially due to the restrictions on federal flood insurance. It is unclear whether this trend will continue as the increasing pressure for development brings private insurers into the market. The burdens of obtaining private insurance and providing the necessary infrastructures, such as roads, sewer, and water, will continue to slow down the construction of single-family summer or retirement residences, but will not have nearly as dramatic an impact on multi-family, condominum development. Until these trends are more fully developed, there will probably be some sentiment in the Congress for only relatively minor changes.

ENDANGERED SPECIES ACT

The Endangered Species Act of 1973 is among the world's strongest laws to prevent species extinction. It does so through a variety of methods designed to bring species back to a point where protection is no longer needed. These include: listing as endangered or threatened; designation and acquisition of critical habitat, harvest and trade controls; state, federal, and international cooperation; and regulation of federal agency activities.

Under the latter provisions, such agencies are required to use their authorities to conserve endangered and threatened species and to ensure that their actions do not jeopardize the continued existence of a listed species or destroy or adversely modify critical habitats. This requirement is carried out through interagency consultation which is intended to identify reasonable development alternatives that do not conflict with species conservation.

The Endangered Species Act was last reauthorized in 1982 through Fiscal Year 1985. Therefore, this legislation will be a major piece of our legislative agenda for the coming year. However, the 1982 amendments contained a number of provisions to improve the implementation of the listing and consultation processes which seem, so far, to have eliminated much of the controversy. At the present time, therefore, we do not have any indication that major revisions will be necessary.

The 1982 amendments also included a provision which allows for long-term permitting decisions, where appropriate, if carried out under a comprehensive conservation plan developed jointly between the appropriate federal wildlife agency, the private sector, and state or local government agencies. I will discuss this mechanism later today in connection with a legislative proposal regarding the Fish and Wildlife Coordination Act.

WETLANDS LEGISLATION

The Clean Water Act, despite frantic activity in both the House and Senate, was not amended during the 98th Congress. Therefore, the next session of Congress should see a renewal of that activity. Because Section 404, dealing with dredge and fill permitting, is one of those issues in which the Congress exhibits extreme schizophrenia, the net effect was no amendments in the past Congress dealing with that Section. It seems likely, although no promises can be given, that future considerations of the Clean Water Act will also, once again, avoid making any changes.

While not impacting directly on the environmental review process, there are two pieces of legislation dealing with the protection of wetlands which I believe are of interest. The first, the Emergency Wetlands Resources Act, was introduced in the House of Representatives by the late Congressman Edwin B. Forsythe of New Jersey and in the Senate by Senator John Chafee. This legislation would provide for a major federal/ state cooperative acquisition effort with an authorization of $75 million per year for 10 years. This acquisition would be in addition to the acquisition programs already in place for waterfowl habitat funded by the receipts from the Duck Stamp and the Wetlands Loan Act.

The bill also included a requirement for the Secretary of the Interior to study the causes of wetlands loss throughout the United States, including, in particular, the contribution of federal assistance and federal programs. Early discussion of the bill considered the elimination of one or more federal programs which would have a generally beneficial effect on the rate of wetlands loss. However, the notable lack of information regarding not only the environmental benefits to be attained by eliminating or restricting federal expenditures or financial assistance, but the economic impacts, including local impacts on property values and community economic bases, precluded a reasonable assessment of which programs should be modified and which should be allowed to remain. Therefore, the Merchant Marine and Fisheries Committee concluded that the compilation of data necessary for an informed and reasonable decision concerning other appropriate mechanisms for achieving the conservation goals was a necessary prerequisite to moving forward.

It was anticipated that the study would culminate in reasonable recommendations for the conservation of wetlands resources based on the evaluation and comparison of all of the management alternatives identified during the study, as well as such other alternatives which may be available to state and local governments -- and to the private sector -- if sufficient incentives were provided. These recommendations would also include appropriate statutory changes as well as recommendations for regulatory change and administrative initiatives. I am pleased that despite the failure of this legislation to pass, the Fish and Wildlife Service has included this study in their budget proposals for Fiscal Year 1985.

The legislation had unusually broad support. Unfortunately, the addition of a controversial rider regarding the construction of channel stabilization jetties at Oregon Inlet on the Outer Banks of North Carolina precluded passage of the bill late in the session. It is anticipated that the bill in substantially identical form will be subject to early consideration during the 99th Congress.

It seems logical that the overall national program for wetlands protection should include not only regulation and acquisition, but incentives for private protection of privately held wetlands areas. Therefore, Chairman John Breaux of Louisiana introduced a bill which would characterize valuable habitat types, including wetlands, and provide for each various tax inventives to encourage the private protection of these areas. Hearings held on this bill were very encouraging and generated significant interest. It is anticipated that this legislation will be revised for introduction next year. There is no doubt that any tax benefit proposals will face a long and arduous journey given the extreme distaste which the Ways and Means Committee holds for legislation which they believe will confuse the tax codes and create new loopholes. However, I am hopeful that sufficient interest will be generated to pass at least some of these proposals.

FISH AND WILDLIFE COORDINATION ACT

I have saved the Fish and Wildlife Coordination Act as the last item on our legislative menu since the discussion of proposed amendments embodies several recommendations which I believe are more generic in nature and apply to the environmental review process in general.

The Coordination Act, first enacted by Congress in 1934, was one of the earliest federal environmental statutes and represents the first attempt to integrate fish and wildlife conservation measures into the Federal Government's water resources planning activities. As amended in 1946, the Act requires federal agencies to administer projects modifying water resources to take fish and wildlife resources into consideration before proceeding. Whenever any agency proposes such a project or permit, it must consult with the Fish and Wildlife Service (NMFS), and the fish and wildife agency of the state in which the project is to be constructed. After consultation, the fish and wildlife agencies may submit a report to the agency responsible for the project, detailing the impacts on wildife and fisheries and may make recommendations for alternative actions or mitigation measures.

H.R. 5755 was introduced by Chairman Breaux and Congressman Don Young of Alaska based on a concept first proposed during the 98th Congress by Congressman Edwin Forsythe. The legislation passed the house relatively late in the session, and the Senate was unable, or unwilling, to take it up in the crush of last minute legislation.

In the nature of legislative bookkeeping, the amendment codifies reorganization Plan No. 4 which divided the responsibilities for the fish and wildlife resources between the National Marine Fisheries Service of the Department of Commerce and the Fish and Wildlife Service of the Department of the Interior. This clarification, while not legally necessary, would preclude the argument that NMFS has no standing in law to comment on water resources projects.

Secondly, in an effort to facilitate participation by the FWS and NMFS in carrying out their responsibilities under the Act, the provision which allows for transfer of necessary study funds from the action agencies to the Fish and Wildlife Service and National Marine Fisheries Service was amended to make such transfer mandatory.

The term "mitigation" is defined in a manner consistent with the definition contained in CEQ's most recent regulations. This would be the first time that a definition for "mitigation" would be included in statute. The term also specifically includes the concept of mitigation measures occurring offsite as well as on-site where appropriate.

The two major provisions contained in H.R. 5755, I believe, are directly applicable to the Federal Government's environmental review process although by nature of the Act itself the legislation, if passed, would only have applied to FWS and NMFS.

The first deals with a lack of information regarding the effectiveness of implemented recommendations and compliance with the terms of permits granted for water development projects. In 1982, a study by the NMFS Southeast Region showed that while NMFS was effective in getting recommendations incorporated as terms in permits, the rate of non-compliance with those terms was as high as 18 percent. A follow-up study showed that 25 percent of the surveyed projects were not in compliance with the terms of the permit. In response to questions from Congressman Forsythe in 1983, the Director of Civil Works of the Corps of Engineers wrote that, "During the last few years, more attention has been given to the process by which balanced, timely decisions are rendered on permit applications. Enforcement and surveillance have consequently not been to the forefront of the program." The Director went on to say, "Exact data is not available; however, non-compliance has not been represented as a major problem by Corps Districts." Inquiries to the other agencies involved also reveal a nearly complete lack of follow-up on the effectiveness of the incorporated recommendations and a lack of monitoring of the permittees' work to ensure compliance. In other words, no one is able to estimate, on a national basis, how many recommendations were included in the project requirements and, in fact, complied with; nor is anyone able to estimate if those recommendatons which were implemented had the desired effect on environmental resources or, indeed, if they were necessary at all.

Lack of effective and speedy compliance monitoring and enforcement can only serve to discourage those who depend upon the Federal Government to protect the nation's valuable natural resources. Additionally, lack of effective enforcement works to the detriment of responsible permit applicants by undercutting their ability to sell the need for compliance to funding decision makers.

On the other hand, the availability of sound data regarding the effectiveness of permit recommendations to achieve the desired effect is absolutely vital to forestall criticism regarding the need for implementation of those recommendations. Until we can show that recommended permit conditions will in fact achieve their stated goals -- and no more -- through reasonable and appropriate mitigation or alternative implementation, the program will continue to fall prey to cries of overzealousness.

Therefore, in the proposed amendments to the Fish and Wildlife Coordination Act, the responsible federal commenting agencies are required to prepare a listing, by categories, of the projects reviewed and those for which recommendations were made. The commenting agencies would then select a statistically significant sample of project recommendations and, following review by the action agencies regarding compliance with those recommendations, would evaluate the results and effectiveness of such compliance. The Fish and Wildlife Service and National Marine Fisheries Service would be required to report to Congress every two years regarding the results of the studies. I believe that the implementation of this kind of follow-up study will not only add to the credibility of the program, but will result in significant technical and administrative improvements in the process.

Finally, the amendment included provisions that the Secretaries of Interior and Commerce may participate with appropriate federal, state, and local agencies and with private organizations or entities, in the preparation of plans which comply with existing law and which promote the conservation or enhancement of wildlife and wildlife habitat and the reconciliation of conservation goals with other objectives and uses. Further, with respect to each such plan, the Secretary may enter into contractual agreements that provide assurances, again consistent with law, regarding the value and extent of the habitat to be conserved or enhanced, the mitigation to be provided for the affected wildlife resources, and the nature and extent of habitat modifications to be permitted.

While it can be, and has been, argued that the federal agencies already have the authority to participate in such planning and make such agreements, I believe that inclusion of specific language in statute will avoid uncertainty at Headquarters and Regional levels.

This concept grows out of the conservation plan language contained in the Endangered Species Act Amendments of 1982 which I previously mentioned. The provision in the Endangered Species Act is modeled after a habitat conservation plan that had been developed by three Northern California cities, the County of San Mateo, and private landowners and developers to provide for the conservation of the habitat of three endangered species of butterfly within the San Bruno Mountain area of San Mateo County. The terms of that agreement required a unique partnership between the public and private sectors in the interest of species and habitat conservation. Broad areas were set aside for conservation, and funding plans were implemented to ensure continued operations.

It is recognized that significant development projects, such as port development, often take many years to complete and permit applicants may need long-term permits or many serially issued permits. In this situation, and in order to provide sufficient incentives for the private sector to participate in the development of such long-term conservation plans, plans which may involve the expenditure of hundreds of thousands, if not millions, of dollars, adequate assurances must be made to the financial and development communities that a reasonable and implementable permit processing mechanism can be made available for the life of the project.

With a specific short-term project, a developer may negotiate and obtain the necessary permits and be relatively certain that things will not change by the time the development is completed. On the other hand, if the project is multi-phased and extends over a long period of time, the developer cannot be assured that the rules will remain the same, particularly where there are a number of governmental agencies involved or when new agencies are created to address previously unrecognized concerns.

Conversely, the environmental agencies and environmental interest groups are concerned that in addressing a single project the interest of the ecosystem, or the region on the whole, are often overlooked because the geographical boundaries of the project may not be broad enough. Cumulative impacts may be overlooked because the projects are considered in permits issued on a piecemeal basis. In allowing a single project portion of an overall development plan to proceed, they view the resource at risk because they are not assured that the remainder of the ecosystem or resource will be protected.

The net result is that a confrontational mentality between development and conservation interests may work to the long-term detriment of all interests. The habitat is slowly lost, piece by piece, as the demands for facilities become overwhelming and the costs of development become greater and greater. Developers complain about the intransigence of the conservationists, and the conservationists point to the ruthlessness of the developers.

It should be emphasized that the need for assurances extends to all interests -- assurances for the developer that his rights to develop, once obtained, will not be further unreasonably impeded by additional layers of governmental regulation; and assurances to conservationists that the loss of resources thorough development will be finite, not continual, and that programs for species and habitat enhancement and environmental protection will be properly implemented and not mere empty promises.

I believe one reason why there have been so few agreements is that there has been some question as to the extent of the authority of federal agencies to enter into long-term agreements that may impair, in effect, an agency's subsequent ability to regulate private sector activities. As a result, there is a general reluctance to provide such commitments. In turn, there has been a reluctance on the part of some developers and local agencies to rely on federal agency commitments, even those in contractual form, without further legislative authority. In fact, there is no specific language in any of the three major federal statutes regarding the protection of the environment which expressly provides for such agreements other than the recent amendment to the Endangered Species Act.

Mitigation banks have been discussed for several years, but to my knowledge there are only two in actual operation today. One is the program contemplated by the Congress in legislation establishing the Tensas National Wildlife Refuge in Lousiana. The other is the recently announced Tenneco Mitigation Bank, also in Louisiana. I understand that there have been problems in the implementation of the Tensas Mitigation Bank. It is much too early to know whether the Tenneco agreement will succeed, but I note, for example, that the Corps of Engineers is not a signatory to the Tenneco Memorandum of Understanding.

However, mitigation banks are only one example of the form which these agreements might take. Others would include habitat conservation plans which focus on a discrete habitat, such as the San Bruno Mountain or a specific wetland system; species oriented programs which provide for the conservation of a single species throughout its range in relation to competing activities; or areawide plans for ports or large land holdings.

It is clear that not all, or even most, of the permitting decisions made in the United States would be amenable to longterm agreements. Obviously this mechanism would not apply to the bulk of minor 404 permit applications. However, for longterm, large-scale development projects the availability of this type of cooperative, comprehensive mechanism can only be beneficial.

The legislative proposal which we considered during the last Congress did not specify the constraints which should or would be placed on such agreements. However, it is clear that such agreements cannot abrogate the federal agencies' responsibilities to carry out their regulatory procedures. It is likewise clear that the implementation of a meaningful agreement will depend upon the availability of appropriate accounting procedures such as the Fish and Wildlife Service's Habitat Evaluation Procedure. Finally, any agreement must contain provisions which will allow for the consideration of unforeseen circumstances which may occur during the life of the agreement.

The amendments to the Fish and Wildlife Coordination Act will be reintroduced during the next Congress and it is hoped that sufficient time will be available for full consideration in the Senate as well as the House of Representatives. Nevertheless, I believe that conflict resolution through the use of long-term agreements where appropriate can, and should be, implemented now by all of the federal agencies involved -including the action agencies -- in cooperation with state, local, and private entities.

I would like to once again thank the sponsors of this conference and you for your interest.

JAMES S. STOKES

James S. Stokes is a partner in the Atlanta law firm of Alston & Bird. He is the firm's lead environmental attorney.

Mr. Stokes has extensive experience in all aspects of environmental regulation and litigation, including environmental impact statements and air and water quality matters. He has been heavily involved in hazardous waste management activities under RCRA and in clean-up actions for a number of hazardous waste sites in Georgia and around the country, representing both site owners and generators of waste. Clients with environmental concerns which he has assisted include manufacturers of chemicals, steel, lead, appliances, flexible packaging and various other products, timber and mining interests, the major hazardous waste clean-up company in the Southeast, real estate developers, and various governmental and other public authorities.

He has written and spoken extensively in the environmental area and served as Chairman of the State Bar of Georgia's Environmental Law Section from 1979-1982. He serves as environmental legal counsel to the Business Council of Georgia, the trade association for business and industrial interests in the State. He is one of Georgia's representatives on the EPA Region IV Business/ Industry Council and serves on the Georgia Industrial Developers' Association Hazardous Waste Committee. He also serves as the Vice Chairman of the Atlanta Chamber of Commerce Water Resources Task Force.

Mr. Stokes earned his bachelor of arts degree from Davidson College in 1966, graduating Phi Beta Kappa. He completed Yale Law School in 1969. After graduation, he served as an Assistant to the General Counsel of the U. S. Army where he was involved in numerous environmental matters relating primarily to the Army Corps of Engineers permitting programs. Mr. Stokes presently serves as Chairman of the City of Atlanta's Zoning Review Board.

LIVING WITH ENVIRONMENTAL REGULATION-- A BUSINESS CHALLENGE

JAMES S. STOKES
ALSTON & BIRD

Many responsible companies which are committed to environmental compliance too frequently encounter roadblocks presented by EPA and State regulatory agencies. The roadblocks are often not intentionally erected. However, they do exist and can be avoided.

My presentation addresses three such roadblocks:

(1) Lack of cooperation by EPA and State environmental agencies to present a consistent set of requirements for industry.

(2) Lack of consistency from one EPA region to another and lack of consistency in treatment of competitors.

(3) Presentation of a moving target for industry compliance, with there being no assurance that the required method or time of compliance will not be changed after an industry has already made substantial financial and other commitments to an agreed-upon compliance program.

CASE HISTORIES

Before discussing these roadblocks, I want to describe three case histories which illustrate them. While the case histories concern compliance with EPA's limitations on volatile organic compound ("VOC"), or hydrocarbon, emissions, they could just as easily involve the environmental review process or other environmental regulatory activities.

By way of background, VOC's in the atmosphere are involved in highly complex and not fully understood reactions which produce ozone. As a general matter, compliance with various VOC emission standards was required either at the end of 1982 or 1983. Such compliance is usually achieved either by incineration of VOC emissions or by utilizing substantially reduced amounts of volatile solvents in surface coatings, ink and other materials producing VOC emissions. This approach is referred to as "low solvent technology."

In 1978-1979, EPA determined that industry should be provided three years beyond the regulatory compliance date to develop low solvent technology in order to comply with VOC emission limitations. In making this decision, EPA recognized that:

> In the long run, use of [low solvent] technology is preferable to incineration from the point of view of reliability and maintenance of controls, as well as for purposes of energy consumption.

45 Fed. Reg. 80824, 80825 (Dec. 8, 1980).

As I will discuss, EPA changed this policy in mid to late 1983, with major impacts upon regulated industries.

The three case histories deal with companies in different regions and different States, whose identity is not important. To help distinguish these situations, I have given each of them a name, with the first being the "litigation case."

Litigation Case

In 1981, the Company involved was issued a State order extending the compliance time for three years through the end of 1985. This extension was granted to provide time to develop low solvent technology. EPA was notified of this order, but the order was never submitted for EPA approval as an amendment to the State Implementation Plan ("SIP").

However, a State order issued about the same time providing a similar extension to another company in the same county was submitted to EPA and was approved as an SIP revision.

In mid-1983, EPA issued to the Company a Notice of Violation stating that the Company was exceeding the VOC emission limitation. Even though the State order provided for compliance at the end of 1985, the EPA regional office wanted compliance by September 30, 1984, fifteen months before the State deadline. The EPA regional office and the State agency were at such loggerheads that they were unable to work together to explore a resolution.

Because of the state of the art, the Company knew that it could not implement low solvent technology in order to comply by September 30, 1984. The only alternative was installation of an incineration system, and the Company was committed to achieving compliance by low solvent technology.

When the Company would not agree to EPA's demands, the Government filed suit, and the litigation is in progress.

Company Mediation Case

As with the litigation case, the Company in this case was issued a State order extending the compliance time through the end of 1985. Also as with the litigation case, this order was never submitted to EPA for approval as an amendment to the SIP.

In early 1984, EPA issued to the Company a Notice of Violation. In response to this Notice, the Company met with representatives of both the EPA regional office and the State environmental agency. At this meeting, the Company agreed to make major submissions concerning its low solvent developments as well as a proposed compliance schedule, both of which the Company did.

For the next two months, the Company heard nothing until it received a letter from EPA asking for information concerning the level of its VOC emissions. Upon inquiring, the Company learned that its response to this letter would provide the basis for an enforcement action if some resolution were not achieved.

Knowing about situations similar to the litigation case I have just discussed, the Company contacted both EPA and the State agency and, on its own motion, worked with them to bring about a resolution. The Company's efforts resulted in at least some cooperation between EPA and the State agency where there had been little. This cooperation has resulted in a proposed State order extending the compliance date through the end of 1985 which is likely to be approved by the State and EPA.

EPA-State Cooperation Case

In mid-1982, the State involved approved a compliance extension for this Company through the end of 1987. At the public hearing held prior to this approval, EPA stated that such an extension was approvable.

However, in mid-1983, EPA notified the State that it would be unable to approve the extension and required a schedule providing for compliance by the end of 1986.

Since receiving this information, the Company has worked with the State agency to develop a compliance schedule, and the State agency has worked with EPA to obtain its approval. The process has gone smoothly, largely because EPA and the State have a good working relationship.

THE THREE ROADBLOCKS TO COMPLIANCE

The facts of these three cases provide a revealing commentary on the three roadblocks I mentioned at the beginning of this presentation.

Lack of EPA-State Cooperation

EPA attempts to delegate most programs to the States to administer, with EPA remaining in an oversight posture. In practice, such delegation often does not actually occur either because EPA is not willing to release its authority or because the State does not carry out its responsibilities, due to funding or other reasons. EPA frequently appears to be concerned that the States will not be as stringent in their enforcement efforts as is EPA.

All too often, EPA regional offices and States simply do not get along. The "litigation case" and "company mediation case" are clear examples of this. Should a company have to mediate between EPA and the State agency? Obviously not, but the company must do so in its own self-interest in order to achieve a resolution.

The fact is that when an EPA regional office and a state agency do not get along, the big loser is going to be the company involved in a regulatory action before EPA and the State. On occasion, these disagreements are insoluble as in the "litigation case."

From my standpoint as a lawyer representing industry, explaining to company officials the EPA-State disagreements is very difficult. It is not convincing to tell a company official that these disagreements are just a fact of regulatory life. The disagreements should be avoidable in most cases and certainly should not have to be resolved by the company involved. Nevertheless, the company often has no choice but to resolve the EPA-State dispute in order to obtain the permit or approval to which it is entitled.

The examples involving VOC emissions which I have given are only illustrative. Such disagreements appear in all sorts of environmental regulatory activities. For example, in the environmental review process, the situation changes little if the agencies involved are the Corps of Engineers and EPA or the Corps and the Fish and Wildlife Service, rather than EPA and a State agency.

Inconsistency Among Regions and Competitors

In considering the three case histories, it is obvious that the companies in the EPA-State cooperation case and to a lesser extent in the company mediation case have an advantage over the company involved in the litigation case. The situations are all very similar, and yet three different regions have three very different ways of handling them.

Without question, the EPA-State cooperation case is the way that the situation should be handled.

The litigation case illustrates industry's substantial concern with EPA actions providing advantages to a competitor or similarly situated company. If the State agency in the litigation case had submitted to EPA the order extending compliance time for the Company involved, as it did for a similarly situated company, the State order would probably have been approved as an SIP revision and there would be no litigation. Instead, the Company now faces the expense of litigation with the Government while the company with the approved SIP revision continues to operate without interference. This is not only unfair but provides the kind of competitive advantage that EPA decisions are supposed to avoid.

Such inconsistency makes it very difficult for company officials to comply with environmental requirements without reservation. It also causes company officials to question the soundness of other environmental requirements. Achieving the goal of environmental compliance should not be so burdensome for companies which want to comply.

The Moving Target

As long as I have been involved with environmental regulation, a major concern of industry has been that EPA's decisions be ones on which companies can rely for a significant period of time.

Too often, within a year or two after making what is supposed to be a long-lasting decision, EPA changes the method or time for compliance, or both. By then, industry has already made substantial financial and other commitments. These either must be modified at greater cost or must even be discarded entirely with the company starting over. It is to avoid such changes that Section 306(d) of the Clean Water Act provides that a source constructed to meet all applicable standards of performance shall not be subject to any more stringent standard of performance during a ten-year period after construction is completed. This avoids the moving target.

Likewise, a company granted a three-year extension of time to develop low solvent technology in accordance with EPA's policy should be entitled to rely on this extension even if the State extension order was not approved by EPA. In particular, EPA's demand in the litigation case to move the compliance date forward by fifteen months emphasizes the moving target problem. EPA's change in policy in mid-1983 leaves companies in the midst of their low solvent technology development and with little choice but to add incinerators or face enforcement actions. The result is the very energy consumption and reliability and maintenance problems which EPA has recognized accompany incineration. The result is also additional cost to companies involved.

CONCLUSION

The same roadblocks that I have discussed in the VOC compliance context also apply to the environmental review process and all other areas of EPA regulatory activity. I am not suggesting in any way that companies which cannot achieve compliance because of their own recalcitrance or failure to be informed deserve any relief. What I am suggesting is that responsible, informed companies which are trying to meet their environmental regulatory obligations should not have to be faced with the obstacles posed by EPA-State disagreements, inconsistency among regions and competitors, and moving targets. I hope that during the course of your discussions over the next day, you will address the three roadblocks in the environmental review context and discuss ways in which the roadblocks can be avoided.

WORKSHOPS

NOTE: No exact transcripts of the workshops were made and the following is meant to be a reasonable representation of the comments and issues discussed at the workshops. Each workshop was presented four times, twice during the afternoon of October 18, and twice during the morning of October 19.

WORKSHOP A

THE WORST CASE ANALYSIS ISSUE - WHAT LIES AHEAD

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DINAH BEAR

DINAH BEAR was born October 22, 1951, in Lynwood, California. She received a Bachelors of Journalism degree from the University of Missouri at Columbia, Missouri. In 1977, she graduated from McGeorge School of Law, in Sacramento, California. She practiced law with private firms in California and Kansas before coming to Washington, D.C. in 1980. She served as Deputy General Counsel of the Council on Environmental Quality from May 1981 to November 1982; Acting General Counsel from November 1982 to January 1983, and was appointed General Counsel in January 1983.

She has been admitted to practice by the State Bar of California, the District of Columbia Bar, and the U.S. Supreme Court. She is a member of the Federal Bar Association and the American Bar Association, Section on Natural Resources and the Environment.

Good Morning/Afternoon! Welcome to the CEQ workshop about the worst case analysis issue. My name is Dinah Bear, and I am General Counsel of the Council on Environmental Quality. I have with me, for this panel discussion, Beverly Carrera, environmental coordination specialist for the U.S. Forest Service, and John Elliott, who is on detail to CEQ from EPA's Senior Executive Service to help us with a number of projects.

As all of you know, one of CEQ's primary responsibilities is oversight of the National Environmental Protection Act (NEPA). As part of that responsibility, CEQ issued binding regulations in 1978 to implement the procedural provisions of NEPA. During the past 3 1/2 years, the current Council has observed the implementation of these regulations with much interest. In general, the conclusion has been that the regulations are good and work well.

There is, however, one rapidly developing area of NEPA law which is of great concern to the Council. That is the requirement to prepare a worst case analysis in an EIS when information relevant to adverse impacts is essential or important to a decision and the means of obtaining the information is either exorbitant or unknown.

You may wonder why we chose this topic for a workshop here in Region IV, which has, as yet, been untouched by this issue--at least in the courts. I decided on this subject because I believe that it is currently the area of NEPA law with the most potential for change, both within the framework of the Council and the courts, and that the issue will emerge in Region IV in the not so distant future.

The regulatory basis for the worst case requirement is found at 40 C.F.R. 1502.22(b). That regulation addresses the question of what an agency must do if it is evaluating significant adverse effects on the human environment in an EIS and there are gaps in relevant information or scientific uncertainty. First, the regulation makes it clear that if this situation exists, the agency must make it clear that such information is lacking or that uncertainty exists.

Secondly, if the information relevant to adverse impacts is essential to a reasoned choice among alternatives and is not known and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement.

Finally, we come to the "worst case" requirement. If (1) the information relevant to adverse impacts is essential to a reasoned choice among alternatives and is not known and the overall costs of obtaining it are exorbitant or (2) the information relevant to adverse impacts is important to the decision and the means to obtain it are not known (e.g., the means for obtaining it are beyond the state of the art) the agency shall weigh the need for the action against the risk and severity of possible adverse impacts were the action to proceed in the face of uncertainty. If the agency proceeds, it shall include a worst case analysis and an indication of the probability or improbability of its occurrence.

Although this requirement did not receive much attention at first, last year's decision in Sierra Club v. Sigler by the Fifth Circuit Court of Appeals sparked a great deal of interest in this requirement, and has stimulated much litigation. The Sierra Club v. Sigler decision focused on an EIS prepared by the Army Corps of Engineers for construction of a deepwater port and crude oil distribution system in Galveston, Texas. The plaintiffs successfully claimed that the EIS should include a worst case analysis analyzing the effects of a total cargo loss by a supertanker in Galveston Bay. In agreeing with the plaintiffs, the Fifth Circuit praised the new CEQ worst case regulation as one which "is sensible and addresses a widely recognized abuse by agencies -- who previously had cloaked themselves in ignorance -- while preventing agency action". (18 ERC 1660). It also determined that remoteness was not a criteria for when a worst case analysis should be prepared and refuted the lower court's concerns about the speculative nature of the worst case analysis. "There must be," the Court said, "a base of information upon which to project past these limits, but the projections themselves cannot be subject to the same rigorous scrutiny other information in the EIS must endure".

In Village of False Pass v. Watt, plaintiffs challenged the Interior Department's issuance of oil and gas leases under Lease Sale 70 for 2.7 million acres on the outer continental shelf of

Alaska. The court found that the EIS lacked crucial information on the effects of pre-exploration seismic surveys on two endangered species of whales. The judge enjoined the lease sales until Interior either gathered sufficient additional information in a supplemental EIS, or, if that was not possible, prepared a worst case analysis.

The Second Circuit Court of appeals took a different approach to the worst case analysis requirement in the case of The City of New York and the State of New York v. The United States Department of Transportation and Commonwealth Edison Company. That case involved the Department of Transportation's proposed promulgation of rules which would govern the highway transportation of large quantities of radioactive materials. DOT prepared an environmental assessment for the proposed regulations, which was followed with a Finding of No Significant Impact. However, the environmental assessment noted that there was one possible significant risk from the promulgation of rules -- the risk of a serious accident with substantial leakage of radioactive gases. DOT's risk assessment estimated the probability of such an accident to be approximately once every 300 million years. The agency then determined that this high degree of improbability made the preparation of a worst case analysis and an EIS unnecessary.

The District Court ruled the environmental assessment inadequate because DOT had insufficiently analyzed the probability of a high-risk accident and the consequences of such an accident. The District Court believed that DOT improperly considered the risk of the worst case insignificant because of the low probability of its occurrence.

The Second Circuit disagreed with the lower court. In regards to the worst case issue, the majority on the Court of Appeals overturned the District Court's determination that DOT was obligated to prepare an EIS. The Court specifically rejected

> an automatic rule requiring preparation of an EIS for every action that has any possibility, however remote, of causing serious accidental injury. Such a rule would routinely require an EIS for federal actions, since it is hard to imagine any agency action involving people or equipment that is not subject to some estimatable risk of causing serious accidental injury. In this case, reasonable minds may differ as to whether or not the gravity the "worst case" accident or other less serious accidents, discounted by their improbability, presents an overall risk of sufficient significance to warrant an EIS. So long as that choice falls within the range of reasonable dispute, an agency's informed decision not to require an EIS is neither arbitrary nor capricious.

The majority of the Court of Appeals emphasized the deference courts should give to agency decisions in the environmental field. This deference, the majority wrote, should be accorded the agency both in terms of the method of risk assessment employed and DOT's conclusion that promulgation of the rules would have no significant impact on the environment.

Judge Oakes, in a dissenting opinion, viewed DOT's decision not to prepare an EIS as arbitrary and capricious. In his view, the "worst case" scenario identified by DOT would compel preparation of an EIS.

The greatest number of lawsuits based upon the worst case requirement have focused on its application to the spraying of pesticides and herbicides on Forest Service and Bureau of Land Management lands in Oregon. The first case to be decided on this issue by the Ninth Circuit, Southern Oregon Citizens Against Toxic Sprays, Inc., v. Clark, focused on BLM's spraying program in forest lands in Oregon to control non-commercial vegetation and to promote timber production. BLM filed a programmatic EIS in 1978 to cover the spraying program for 10 years, and files annual EA's to update the EIS. The district court concluded that there was uncertainty regarding the use of one of the subject herbicides, 2, 4-D, and held that the scientific uncertainty, coupled with the potential danger to human health, required a worst case analyses. The court determined that the uncertainty regarding safe levels of the herbicides in question triggered the need to prepare a worst case analysis, despite the agency's belief that the worst case was unlikely to occur. Further, the court found that the registration of a herbicide under FIFRA did not excuse BLM from preparing the worst case analysis. They also ruled that the worst case analysis was required even though the relevant NEPA document was an environmental assessment rather than an EIS. This summer the Justice Department, on behalf of the Department of Interior, presented a petition to the U.S.

Supreme Court asking them to hear this case. We anticipate their decision sometime in the middle of November.

The most recent "worst case" decision also comes from the Ninth Circuit and also deals with the spraying of herbicides on federal land, again, in the context of an environmental assessment. In the combined opinions of Save Our Ecosystems v. Clark and Merrell v. Block, the Ninth Circuit found a worst case analysis prepared by BLM to be brief, cursory, based upon an entirely wrong assumption, and, in short, inadequate. It further found an environmental assessment, at least in this case, and apparently in any case in which a worst case analysis is included, to be the functional equivalent of an EIS and thus subject to the same procedural requirements as an EIS, including a 45 day public comment period. The decision also reiterates the SOCATS holding that agencies cannot rely on registration of a herbicide under FIFRA (Federal Insecticide Fungicide and Rodenticide Act), finding, among other things, that "EPA's data is partial at best, and suspect at worst, because of the testing scandals. The availability of the data of the chemical companies is also in question." Thus, the Court concluded, that the agencies must do their own independent research on the health effects of a herbicide if no adequate data exists. The Court ordered the District Court to broaden its initial injunction to effect a total ban on spraying until adequate worst case analyses had been prepared. The government currently has a petition for a rehearing of these consolidated cases in front of the Ninth Circuit.

There have been and currently are several lawsuits involving the worst case issue at the district court level. Many of these involve the proposed use of herbicides. One case, decided this summer by a district court in Oregon, involves a different situation. In that case, National Wildlife Federation v. U.S. Forest Service, the Forest Service proposed a timber sale in a certain area of the Siuslaw National Forest. An EIS had been prepared in 1979 for timber harvest levels in the National Forest and site specific EAs were prepared for individual sales. The area of the proposed sale in this case is vulnerable to severe effects of landslides, which, among other things, can affect water quality and fisheries' productivity. The Forest Service proposed to use leave areas and other mitigation techniques to overcome these problems. The court found that it is uncertain that leave areas will effectively prevent landslides, and that "Without accurate evidence of the effectiveness of leave areas as mitigation techniques, the Forest Service must prepare a worst case analysis. Here, a worst case analysis should reflect a serious reduction in anadromous fish habitat."

We are concerned with the Ninth Circuit's assumption that an environmental assessment becomes the functional equivalent of an EIS upon the inclusion of a worst case analysis. First, the regulations simply do not require preparation of a worst case analysis in an EA. Second, there is no precedent for applying the procedural requirements of an EIS to an EA. There is already a tendency on the part of some agencies to treat an environmental assessment as a mini-EIS, which it is NOT. It is our feeling that environmental assessments should be, as stated in the regulations, brief concise public documents -- the suggested page length is ten to fifteen pages. If more is needed, or an agency knows that the proposal is a major federal action significantly affecting the quality of the human environment, the agency should be preparing an EIS. But environmental assessments have their own particular purposes and should not be transformed into simply a sub-species of EIS(s).

There are additional problems looming behind the worst case issue which, I believe, go beyond the issue of which procedural requirements attach to which type of document. There is widespread confusion right now as to exactly what a worst case analysis is -- is it someone's best guess as to what the worst possible occurrence might be, or is it an elaborate analysis based upon data models; if EPA's risk assessment process is not acceptable, is there any recognized risk assessment technique that is acceptable? How is "worst case" defined in any given situation; can't someone always think of some factor in a given scenario which would make the "worst" worse? Is a "worst case" analysis helpful to a decisionmaker and meaningful to the public?

Further, neither the judicial nor the executive branch has addressed the very basic question of how the worst case analysis requirement fits into the technique of risk assessment. This would seem to be a particularly vital question with respect to the decisions regarding the possible carcinogenic effects of chemicals and the courts' obvious mistrust of EPA's risk assessment work. As I have become more involved in this issue, I feel that at least some of the problems in this area come from what seems to be a rather traditional and entrenched lack of communication between lawyers and scientists on issues such as this one. Very few lawyers, I suspect -- certainly not myself, and hence, few judges have had training in the science of risk assessment; very few understand its possibilities and limitations. Everyone concerned, however, wants a worst case analysis to be something credible and meaningful to the decisionmaker and the public.

These are just a few of the questions which we are beginning to grapple with in connection with this issue. To help us in finding some answers, we plan to seek the help of experts in the field of risk assessment both in and outside of government and ask for their recommendations on the worst case issue. We will also be considering the legal and public policy aspects of this issue. I cannot tell you at this point what we are going to say or exactly how we will say it; I can assure you that we mean to approach it in a thoughtful and thorough manner. Whatever proposal or proposals emerge from this process, we will seek the viewpoints of all interested parties, including participation from the public, and there will be a very open process.

JOHN H. ELLIOTT, JR.

JOHN H. ELLIOTT, JR. has wide-ranging experience in both the private sector and government. Fifteen years of private sector experience includes purchasing, owning, and serving as president of a $15 million annual sales wholesale and retailing operation. Additionally, he co-owned a company which bought and sold steel mill electrical equipment.

He joined the Environmental Protection Agency (EPA) in 1973, and managed the Standards and Regulations Division, which exercised oversight over the development of all EPA regulations until 1975. He returned to the federal government in 1979 as a consultant to EPA's Office of Pesticides and Toxic Substances, and later to the Office of Planning and Management. In 1980, he was appointed as the Deputy Office Director of the then Office of Administration, which had agency-wide responsibility for personnel, facility engineering and support services, contracts, automated data processing, and library services. He is currently on detail to the Council on Environmental Quality, where he acts as Project Director for Annual Environmental Quality Reports, and for the Cabinet Council's Global issues Working Group.

John is a graduate mechanical engineer from Carnegie Mellon University.

WORST CASE" ANALYSIS - HOW TO, WHEN TO, AND OTHER QUESTIONS

By John Elliott

Council on Environmental Quality

I am most decidedly not a lawyer -- rather an engineer by training. Consequently, I will present a non-legal perspective of questions/problems regarding "worst case" analysis from someone with a background in estimating effects, developing an assessment of risk, and determining how to manage risk.

A word about my background and risk assessment. I have spent more time in business than in government, and can attest that it is fraught with risk and situations demanding risk management. More pertinently, I ran the EPA standards and regulations process in the early 1970s, which got involved in risk assessment, both implicitly and explicitly. While in that job in 1974, I managed the first carcinogen risk assessment done at EPA on vinyl chloride, which resulted in a vinyl chloride standard being issued in 1976 -- which I will discuss further in a moment. While in government, I was a member of five cancer policy committees (three at EPA, and two inter-agency), all of which concluded with notable lack of success. These experiences have made me realize how difficult estimating effects, doing risk assessments and managing risk is.

This brings me to the topic at hand - "worst case" analysis. One of the most troublesome things to me about "worst case" analysis is the name. As you can well imagine, any lawyer worth his Mercedes can dream up a worse "worst case". Let me present a hypothetical, although admittedly unlikely, example in a new area where we expect "worst case" analysis to be required - genetic engineering. An area where experimentation is being done is in growing tomatoes. I can just imagine a worst case developed in the fertile imagination of some lawyer involving giant killer tomatoes who devour Cleveland. A real and current case is the spraying of a pesticide or herbicide containing a suspected human carcinogen - a good argument can be made that the "worst case" is that the maximum possible number of people are exposed under some freak set of circumstances, and that everyone so exposed contracts cancer and dies. This brings up several questions. Is such a "worst case" approach realistic? Does it help decision-maker or public? I strongly believe the answer to both these questions is no.

Some background on "worst case" analysis might be helpful before attempting to answer these questions. The "worst case" analysis section of NEPA guidelines was thought up by lawyers who had no experience in estimating effects or assessing risks. They assumed "worst case" would only be employed a small percentage of the time, since adequate effects and risk assessment information could be obtained from the public sector. Actually, any of us involved in risk assessment know that the converse is much more likely to be true. An example of this, which I previously mentioned, is the vinyl chloride risk assessment. Vinyl chloride causes a cancer of the liver in humans which is almost invariably fatal. In the case of vinyl chloride, we had a great deal of information that we usually don't have for suspected carcinogens. We knew that vinyl chloride was a human carcinogen, and knew the human dose response curve (at least at high levels) -- eliminating the mouse-to-man assumption. Further, we had measured ambient concentrations, and knew the routes of exposure and population patterns around the plants which produced vinyl chloride. Despite the above, we caveated our findings by saying calculated effects could easily be off by a factor of 10 or more either way, and even this result was valid only if one believed the major assumption of a linear dose response to zero, which in essence says a million people exposed to one unit of a carcinogen is the equivalent risk of one person being exposed to a million units. I believe this example illustrates that even under the best of situations regarding potential risk to human health, it is unlikely that all desired information will be known or available.

Consequently, in a practical sense, what is "worst case" analysis, and when and how should it be done? Dinah has explained the case law and I am not going to attempt to elaborate -- I just want to emphasize that the regulations pertaining to "worst case" analysis, the pertinent text of which is contained in Table 1, are extremely complicated and controversial. Before getting into the how and when of "worst case", I want to mention two points. First, although I have primarily focused on human health, "worst case" applies to environmental situations as well. For example, the Army Corps of Engineers has been required to address "worst case" analysis for possible oil spills in connection with deepwater ports. Secondly, I want to emphasize that there are a wide range of opinions on how "worst case" analysis should be resolved. One contingent feels strongly that the "worst case" analysis concept is basically flawed, adds nothing to an EIS, and consequently, should be ignored. Another

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Table 1. Pertinent Text of Regulations - Incomplete or Unavailable Information (40 C.F.R. 1502-22)

When an agency is evaluating significant adverse effects on the human environment in an environmental impact statement, and there are gaps in relevant information or scientific uncertainty, the agency shall always make clear that such information is lacking or that uncertainty exists.

(a) If the information relevant to adverse impacts is essential to a reasoned choice among alternatives, and is not known, and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement.

(b) If (1) the information relevant to adverse impacts is essential to a reasoned choice among alternatives, and is not known, and the overall costs of obtaining it are exorbitant, or (2) the information relevant to adverse impacts is important to the decision and the means to obtain it are not known (e.g., the means for obtaining it are beyond the state of the art) the agency shall weigh the need for the action against the risk and severity of possible adverse impacts were the action to proceed in the face of uncertainty. If the agency proceeds, it shall include a worst case analysis and an indication of the probability or improbability of its occurrence.

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contingent, comprised primarily of outside environmentalists, feels equally strongly that "worst case" analysis should be done in every EIS, and that it should be an important cornerstone of the EIS process. I suspect that you -- as professionals who are involved in the EIS process -- will generally end up with opinions on handling "worst case" analysis that are not represented by either of these contingents.

Generally, I see the regulations requiring that three basic questions be addressed. While examining these questions, it should be kept in mind that the answers to one question may well influence answers to others. Two of these are "how to" and "when to do" "worst case" analysis, and I feel that if these questions are answered, they will define the issue of "what is worst case analysis". The third, which I think is equally important, but maybe not as obvious, is how to present this information to both the public and decsion-makers. I'll spend some time examining each of these questions, recognizing however, that we don't have answers to questions at this time.

When to do "Worst Case" Analysis

The questions in this section and in the next two sections were compiled from responses of interested agencies to a list I originally generated.

Can the risks to be addressed in analysis under regulation section 1502.22 be identified by the following questions, and if so, which questions and how?

- How can "gaps in relevant information" be defined in a practical, workable manner?
- How can the term "scientific uncertainty" be defined in a practical, workable manner in the context of taking government action?
- How can one determine whether missing information is essential to a reasoned choice among alternatives?
- What factors should be considered when determining whether the costs of obtaining relevant information is exorbitant?
- Should any other thresholds be applied prior to performing such analysis (for example, a threshold of probability, a threshold of severe consequences, etc.)? If so, when and how in the process should such a threshold be applied?
- What types of effects (e.g., potential cancer risk, irreversible substantial environmental damages, etc.) should be considered as warranting analysis?
- What types of actions warrant a worst case (or risk) analysis?
- Should worst-case analysis be limited to those situations where resulting impacts could have significant effects on the human environment?

- o Does the division in the regulation 1502.22(b) between items (1) and (2) articulate an appropriate and workable standard for determining when such an analysis should be prepared?
- o Should a worst-case threshold be variable, depending on the potential severity of possible impacts from an unlikely event?

In a prior CEQ approach of when to do "worst case" analysis, CEQ employed a threshold of probability. In 1983, CEQ issued guidance which recommended a threshold for doing "worst case" of reasonably forseeable. This guidance was withdrawn for further consideration, based on comments and criticism which suggested guidance did not effectively and appropriately recognize the complexity of "worst case" analysis. Another very interesting issue to be resolved regarding "when to" is whether "worst case" should address actions such as criminal activity or terrorism, which may have a higher probability than other scenarios being addressed.

How to do "Worst Case" Analysis

What kind of analyis will best identify gaps in knowledge and scientific uncertainty, and ensure that decision-makers and the public are appropriately informed of possible adverse impacts of proceeding, despite insufficient knowledge or scientific uncertainty?

- o What analytical methods are appropriate for developing such an analysis (e.g., "decision tree" approach)?
- o Are the probabilistic techniques currently used in nuclear facility siting adaptable for use in worst case analysis?
- o What factors should agencies consider in determining the level of expenditure of resources, time, and effort that is reasonable to prepare such an analysis in the context of preparing an environmental impact statement?
- o Are there appropriate time or geographic limits to consider in a risk analysis?
- o What particular guidelines can be suggested to ensure that the analysis complies with the spirit and framework of the NEPA regulations which state:

  (b). . . "Most important, NEPA documents must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail.

  (c). . . "Ultimately, of course, it is not better documents but better decisions that count. NEPA's purpose is not to generate paperwork -- even excellent paperwork -- but to foster excellent action." 40 C.F.R. 15001.
- o What tests of reasonability can be applied to the analysis?

- What constitutes analytic balance between information gathered on adverse impacts and on probability of impacts?

- Can a prototype worst-case or risk analyses be completed and used for successive similar actions?

One major underlying question regarding "how to" is whether worst case is considered an isolated event or a range of events. It seems to me that the range approach may be more consistent with the overall information purposes of the statute.

There have been limited attempts to do "worst case" analyses. One of these is a fairly sophisticated attempt by the Forest Service to identify cancer risk involved with spraying pesticides. The courts are currently reviewing their approach. A major problem they are having is that courts are questioning the "credibility" of information supplied by agencies. A lot of this problem has to do with how analysis is presented.

Presenting "Worst Case" Analysis Information

How can such an analysis be presented to ensure that all relevant information regarding adverse effects and alternatives receive appropriate attention and weighing by decision-makers and the public?

- How can bias in information presentation best be avoided and balanced achieved?

- How can misconceptions regarding risk arising from material that is factually accurate best be prevented or minimized?

- How can information best be presented to facilitate communication and informed decision-making?

- How do information needs of decision-makers and public differ?

In my opinion, how information is presented is one of the most important areas that needs to be addressed. At a minimum, information presented must be "credible".

Administrator Ruckelshaus, in a recent speech, addressed the "credibility" of government issue, and described how EPA (and other agencies) must regain the "benefit of the doubt" in the eyes of the public and courts and be regarded as "credible" to function effectively. One factor detracting from credibility of risk assessment information is that it isn't usually appropriately caveated. I am sure all of you have seen numbers such as 3.1417 $x 10^{-6}$ excess annual deaths associated with risk of some chemcial in the environment. Only by careful reading, and then usually later in the report, do you discover that the authors have reasonable confidence in that number only within a factor of plus or minus ten, and that only if you accept their assumptions. As an engineer, I was taught never to present a number with more significant places than one has reasonable confidence in. The major problem with presenting data in the above fashion is that the courts, the public and others believe the government knows the risks involved with a great deal more certitude than they are willing to state, and consequently, "credibility" is jeopardized.

Some examples of risk misperception may be useful in illustrating some other difficulties of presenting risk information in a "credible" fashion.

- People overestimate risks which cause relatively few deaths; conversely, underestimate risks which cause relatively large numbers of deaths; and
- People's perceptions are greatly influenced by news reports, and news reports contain biases which are predictable and similar around the country. Both of these sets of biases can be seen in Table 2
- Perception is influenced by how risk is reported, even by professionals who should understand risk, as is illustrated in Table 3.
- Perceptions of everyday risks, versus involuntary risks, such as due to environmental chemicals, are not very accurate. I expect the risks listed in Table 4 may provide a few surprises, even for you professionals.

What are we doing to answer these sets of questions, and to resolve the "worst case" situation? We are exploring panels and conferences involving outside experts, considering issuing contracts or hiring of consultants, and other ways to get informed discussion of issues and questions -- including our participation in this conference. We are reviewing feedback, and based on this, intend at sometime in the not too distant future to issue additional interpretive guidance or regulatory modification in some appropriate form.

Table 2. Statistical Frequency and Newspaper Coverage
in the Eugene, Oregon Register-Guard (R-G) and the New Bedford, Massachusetts Standard-Times (S-T)
for 41 Causes of Death

Cause of Death	Rate per 2.05 x 10^8 U.S. Residents	Subjects' Estimates	Reported Deaths R-G	Reported Deaths S-T	Cause of death	Rate per 2.05 x 10^8 U.S. Residents	Subjects' Estimates	Reported Deaths R-G	Reported Deaths S-T
1. Smallpox	0	57	0	0	26. Drowning	7,380	1,684	47	60
2. Poisoning by vitamins	1	102	0	0	27. Leukemia	14,555	2,496	1	0
3. Botulism	2	183	0	0	28. Accidental Falls	17,425	2,675	15	7
4. Measles	5	168	0	0	29. Homicide	18,860	5,582	278	208
5. Fireworks	6	160	0	0	30. Emphysema	21,730	2,848	1	0
6. Smallpox vaccination	8	23	0	0	31. Suicide	24,600	4,679	29	19
7. Whooping cough	15	93	0	0	32. Breast cancer	31,160	2,964	0	0
8. Polio	17	97	0	0	33. Diabetes	38,950	1,476	0	1
9. Venomous bite or sting	48	350	0	0	34. Motor vehicle accident	55,350	41,161	298	83
10. Tornado	90	564	36	25	35. Lung cancer	75,850	9,764	3	2
11. Lightning	107	91	1	0	36. Stomach cancer	95,120	3,283	0	1
12. Non-venomous animal	129	174	4	2	37. All accidents	112,750	88,879	715	596
13. Flood	205	736	4	10	38. Stroke	209,100	7,109	12	4
14. Excess cold	334	314	0	0	39. All cancer	328,000	45,609	25	12
15. Syphilis	410	492	0	0	40. Heart disease	738,000	23,599	49	30
16. Pregnancy, birth & Abort.	451	1,344	0	0	41. All disease	1,740,450	88,838	111	87
17. Infectious hepatitis	677	545	0	0					
18. Appendicitis	902	605	0	0					
19. Electrocution	1,025	766	5	0					
20. MV/train collision	1,517	689	0	1	Total number of reports (causes 29, 31, 37, & 41)			1133	910
21. Asthma	1,886	506	1	0					
22. Firearm accident	2,255	1,345	8	1	Correlations (R-G vs. S-T)			r =	.97
23. Poison by solid/liquid	2,563	1,013	3	3					
24. Tuberculosis	3,690	658	0	0					
25. Fire and Flames	7,380	3,336	94	46					

Conclusion: Two newspapers, at opposite ends of the U.S. are similarly biased in their reporting of various causes of death. The biases in newspaper coverage relate closely to biases in people's perceptions. Source: Combs, B. & Slovic, P. Causes of death: Biased newspaper coverage and biased judgments. Journalism Quarterly, 1979, 56, 837-843.

TABLE 3. PRESENTATION FORMAT EFFECTS IN MEDICAL DECISION MAKING: SURGERY VS. RADIATION THERAPY

Reference: McNeil, B. J., Pauker, S.G., Sox, H.C. & Tversky, A. On the Elicitation of Preferences for Alternative Therapies. New England Journal of Medicine, 1982, 306, 1259-1262.

McNeil et al. asked 424 physicians, 238 patients, and 495 business students to choose between surgery and radiation therapy for lung cancer.

Problem format was varied with regard to:

a. Risk data (life expectancy vs. cumulative probability of surviving for N years).

b. Outcome framing (mortality rates vs. survival rates)

Results

a. Surgery was generally preferred, but especially so when life expectancy and survival statistics were given.

b. Physicians were influenced as much by format as were laypersons.

c. What are the implictions of these results for informed consent and patient preference elicitation?

Percentage of Subjects Choosing Radiation Therapy Over Surgery

	Cumulative Probability		Life Expectancy	
Format	Mortality Statistics	Survival Statistics	Mortality Statistics	Survival Statistics
Students	43	17	21	9
Physicians	50	16	28	9
Patients	40	22	35	19
Overall	44	18	25	11

Source: McNeil et al. (1981)

TABLE 4. RISKS WHICH INCREASE THE CHANCE OF DEATH IN ANY ONE YEAR BY ONE IN A MILLION (0.000001)

Smoking 1.4 cigarettes	Cancer, heart disease
Drinking 1/2 liter of wine	Cirrhosis of the liver
Spending 1 hour in a coal mine	Black lung disease
Spending 3 hours in a coal mine	Accident
Living 2 days in New York or Boston	Air pollution
Travelling 6 minutes by canoe	Accident
Travelling 10 miles by bicycle	Accident
Travelling 300 miles by car	Accident
Flying 1000 miles by jet	Accident
Flying 6000 miles by jet	Cancer caused by cosmic radiation
Living 2 months in Denver on vacation from N.Y.	Cancer caused by cosmic radiation
Living 2 months in average stone or brick building	Cancer caused by natural radioactivity
One chest x-ray taken in a good hospital	Cancer caused by radiation
Living 2 months with a cigarette smoker	Cancer, heart disease
Eating 40 tablespoons of peanut butter	Liver cancer caused by aflatoxin B
Drinking Miami drinking water for 1 year	Cancer caused by chloroform
Drinking 30 12 oz. cans of diet soda	Cancer caused by saccharin
Living 5 years at site boundary of a typical nuclear power plant in the open	Cancer caused by radiation
Drinking 1000 24 oz. soft drinks from recently banned plastic bottles	Cancer from acrylonitrile monomer

TABLE 4. RISKS WHICH INCREASE THE CHANCE OF DEATH IN ANY ONE YEAR BY ONE IN A MILLION (0.000001) (Continued)

Living 20 years near PVC plant	Cancer caused by vinyl chloride (1976 standard)
Living 150 years within 20 miles of a nuclear power plant	Cancer caused by radiation
Eating 100 charcoal broiled steaks	Cancer from benzopyrene
Risk of accident by living within 5 miles of a nuclear reactor for 50 years	Cancer caused by radiation

Source: Richard Wilson, Technology Review, February, 1979

BEVERLEY N. CARRERA

BEVERLEY N. CARRERA is an Environmental Coordination Specialist with the USDA, Forest Service, Environmental Coordination Staff in Washington, D.C. Beverley began work with the Forest Service in May 1952 in the Division of Information and Education and has served in various capacities in the Division of Engineering and Range Management, the National Forest System Deputy Area Staff, and Programs and Legislation Deputy's Staff. She entered her present position in March 1973, serving as principal assistant to the Director of Environmental Coordination in directing the national program for implementing the National Environmental Policy Act (NEPA) in the Forest Service. Beverley provides national leadership for the Environmental Impact Statement program in the Forest Service and serves as staff specialist, technical advisor, and manages programs and procedures for the implementing of NEPA, providing program direction, coordination, and evaluation on NEPA related activities.

Presented by Beverley N. Carrera, USDA, Forest Service
at the Eighth Annual Environmental Review Conference
Worst Case Analysis Panel
Atlanta, Georgia
October 18-19, 1984

Forest Service Response to Court Decisions on the Worst Case Analysis Issue.

First of all, let me say I don't profess to be an expert in this complicated area of worst case analysis since I haven't been working directly with the worst case issue. My boss, Dave Ketcham, Director of Environmental Coordination in the Forest Service, has been working intimately with worst case and it is unfortunate that he couldn't be here. However, I did get a brief update from Dave last week and he gave me his file to read through so I'll do my best to present the facts as I see them and tell you some of what the Forest Service is doing as an agency to respond to the various court decisions on worst case.

There are ten or eleven cases in litigation relating to vegetation management programs, primarily in the western United States. Several of these cases involve decisions by Judges to hold up spraying of pesticides or herbicides until adequate worst case analysis is done. In three cases, the Forest Service is not a named party, but the outcome of these cases could have significant effect on our programs.

I'll cover several of these briefly since it would take too long to go through all of them. In 1982 and 1983, several Federal District Court decisions challenged Forest Service and Bureau of Land Management herbicide programs in the West. Judges cited inadequate worst case analysis and curtailed some spraying programs. These were the Southern Oregon Citizens Against Toxic Sprays (SOCATS) v. Clark, Save Our Ecosystems (SOS) v. Clark, and Merrell v. Block cases. On December 13, 1983, the Ninth Circuit Court upheld lower court decisions on the inadequacy of Forest Service and Bureau of Land Management worst case documentation. Then on January 6, 1984, District Judge Burns, in the Northwest Coalition for Alternatives to Pesticides (NCAP) v. Block case, enjoined Forest Service in Oregon and Washington and the Bureau of Land Management in Oregon from applying herbicides in any vegetative management programs until adequate NEPA documents with worst case analyses are completed.

In the SOCATS v Clark case which involves the Bureau of Land Management, a petition for writ of certiorari was filed with the Supreme Court in August to review the Ninth Circuit Court decision. The Supreme Court has not yet accepted the petition. We won't know whether or not it will be accepted until after October 22 and probably not before November 15.

In the NCAP v. Block, Clark, Ruckelshaus, et al, the court issued an injunction against use of herbicides based on failure to do adequate worst case analysis. The Chief of the Forest Service deferred all aerial application of herbicides in the Forest Service pending review of this and related decisions. A notice of appeal was filed on April 30, 1984, by the Federal Government. Further action is pending on this case. It is interesting that the Forest Service has halted all spraying in primarily remote forested areas because of these court decisions, yet homeowners use many of the same chemicals routinely in control of weeds in their own yards and gardens in populated areas.

Another significant case for the Forest Service is the Mapleton Lawsuit - again in the Ninth Circuit. In this case the Oregon District Court halted all timber sales on the Mapleton District of the Siuslaw National Forest, charging absence of worst case analysis and inadequate analysis of site-specific and cumulative effects in the 7-year action plan. This involves an area of relatively fragile soils where timber sales and roads are causing extreme erosion. The worst case in this one involves fish habitat. In an amended opinion on August 6, the Judge stated that in the alternative of submitting to the Court a Final Environmental Impact Statement with worst case analysis and cumulative effects for the 7-year action plan, the Forest Service could include a worst case analysis and an analysis of cumulative impacts in an Environmental Assessment for each timber sale in the 7-year action plan. I believe this case is still subject to appeal until October 29. A decision has not yet been made on whether to appeal. Since these cases are still pending in litigation and there are different perceptions of what the Judges are saying, the situation is difficult to say the least. The

Forest Service will comply with the Courts' decisions, but we don't know how yet.

Some of the actions the Forest Service has already taken are as follows:

1. Finalizing background documents on 12 commonly used herbicides for use by field units in conducting environmental analyses and preparing environmental documents.

2. Contracted with a consultant to provide criteria and guidelines on risk analysis with worst case assumptions, and

3. In an effort to satisfy the requirements of 40 CFR 1502.22 and recent court decisions, the Forest Service has developed a conceptual framework for consideration of risk in environmental analysis which features a threshold or screen for triggering risk analysis and consideration of a range of alternative scenarious and probabilities. This approach utilizes the best of current technology and provides a logical approach leading to the proper presentation of necessary information. It outlines the stages that must be passed through in incorporating risk considerations into environmental analyses.

We're using the "risk analysis" terminology because we believe that the common interpretation of the Courts' decisions is that of requiring "worst-worst" which is impossible. Everyone can think of something worse and it gets to be "I can think of a worst worse case than you" sort of thing and can be taken to the ridiculous. We also don't want to jeopardize USDI (BLM's) position in the SOCATS case by using worst case terminology.

It is our feeling in the Forest Service that if we do risk analysis for an environmental assessment, we must come out with a FONSI which, therefore, would not trigger worst case analysis. If we don't come out with a FONSI we would need an EIS. We think that the Ninth District Court Judge is saying that you may do worst case analysis in an Environmental Assessment, but if you do you must treat it like an Environmental Impact Statement and allow a 45-day comment period. In other words, if you want to do an EIS and call it an EA - okay.

During the past year, we have prepared or are in the process of preparing worst case analysis or risk analysis with worst case assumptions in the Gypsy Moth Suppression and Regulatory Program EIS (human health aspects), the Drug Enforcement Agency's Cannabis Eradication Program EIS in which the Forest Service is a cooperating agency (combination of conceptual framework and health aspects), and the Vegetation Management Program EIS for our California Region.

We are working very closely with Justice, USDI-BLM and CEQ and want to work very closely with CEQ in the effort to revise the 40 CFR 1502.22 terminology, to help define "scientific uncertainty" and "worst," and to develop implementation guidance.

WORKSHOP B

BOTTOMLAND HARDWOOD ECOSYSTEMS - ACCOMMODATING DEVELOPMENT AND CONSERVATION NEEDS

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BOTTOMLAND HARDWOOD ECOSYSTEM: ACCOMODATING DEVELOPMENT AND CONSERVATION

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EDUCATION

M.S. Indiana University - Bloomington (1979)
School of Public and Environmental Affairs

B.S. University of Wisconsin - Madison (1977)
Double Major: Zoology/Geography

EXPERIENCE

U.S. EPA (Ecologist January 1984 - present)

I am responsible for Agency Headquarters liaision with the U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service on controversial projects and 404 permits, legislation, and implemeinting the National Environmental Policy Act and Section 404 of the Clean Water Act. I have lead responsibility in an EPA initiative on bottomland hardwood wetlands.

The Conservation Foundation (Research Associate October 1979-December 1983)

I worked in the Coastal and Water Resources Program (under John Clark) on a variety of projects dealing with wetlands and floodplains. As Assistant Director of the National Wetlands Technical Council I helped organize a national workshop on bottomland hardwoods held in June 1980 at Lake Lanier, GA

Two Leave of Absence were taken:

In 1981 to the U.S. Fish and Wildlife Service, Eastern Energy and Land Use Team

In 1983 to the EPA Office of Research and Development where I assisted in planning water quality research at four EPA environmental laboratories.

PUBLICATIONS (Recent)

1. Co-editor with John Clark Wetlands of Bottomland Hardwood Forests (1981). Published in a series titled "Developments in Agricultural and Managed-Forest Ecology" by El Sevier Scientific Publishing Company
2. An article in the March 1983 issue of Technology Review, published at MIT, on using natural ecosystem to treat municipal wastewater.
3. Coeditor with Dr. Paul Godfrey (U. of Mass.) on a book to be published this fall by Van Nostrum Reinholt titled Ecological Considerations in Wetland Treatment of Wastewater

INTRODUCTION

The protection of bottomland hardwood forests of the southern river valleys of the United States has emerged as one of the most controversial wetland issues of the last decade. These floodplain forests have been extensively diked, cleared, and, most often, planted in soybeans, thereby removing them from the riverine ecosystem. In the the lower Mississippi Valley, a recent study by the Army Corps of Engineers estimated the current loss rate to be 100,000 acres per year. The outcome is a gain in cropland, but a loss of wildlife and fisheries habitat, downstream flood mitigation, detrital export, timber harvest, and water quality.

Concern over the environmental impacts caused by destruction of bottomland hardwoods have prompted the U.S. Environmental Protection Agency (EPA) to undertake a comprehensive study of this ecosystem. The purpose is to identify and assess alternative options for more effectively implementing EPA's responsibilities under Section 404 of the Clean Water Act in these wetalnd areas. The objectives are to assemble the most up-to-date scientific information and to identify the environmental consequences of EPA's regulatory options. The approach will be to first characterize bottomland hardwoods in terms of their ecological functions that relate to EPA's Clean Water Act responsibilities (and EPA's specific authorities under Section 404). The next step will be to characterize the impacts of landclearing and hydrologic modification on these functions. Finally, the effect of possible EPA policy options will be analyzed to determine the effectiveness of regulation in influencing the condition and fate of bottomland hardwood wetlands.

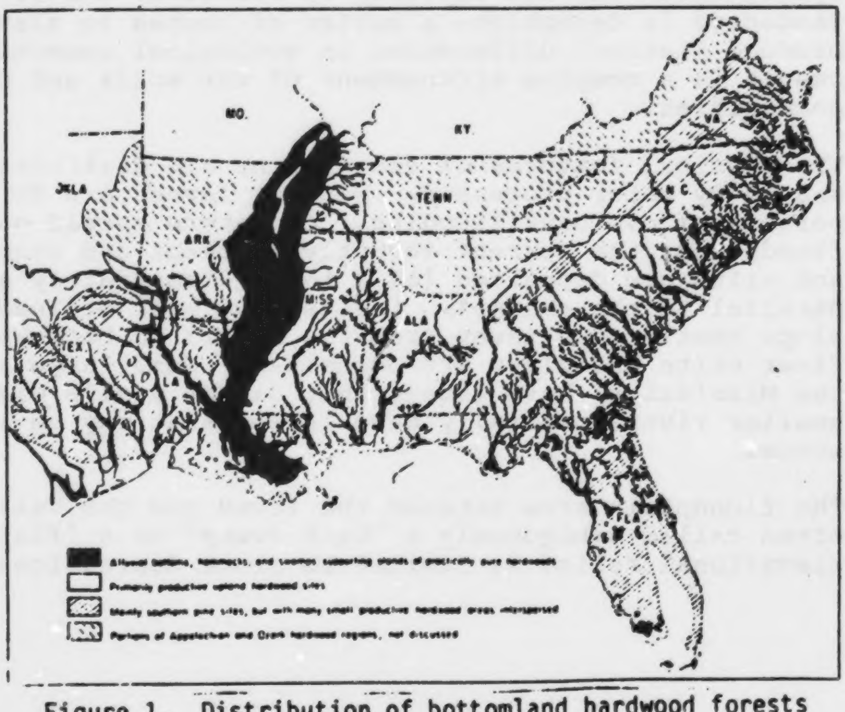
PURPOSE OF SESSION

EPA convened this panel of experts to broadly examine issues associated with bottomland hardwood from a variety of perspectives. Panel members were selected to represent different backgrounds and interests, including agricultural economics, wildlife biology, ecology, agronomy, water resource planning, and forestry. The group came from academe, government, industry and consulting firms. Each brought a different perspective on the resource values of bottomland hardwoods. The panel members began each session with brief statements which flowed into lively audience questions and panel discussion. What follows is a summary of the presentations and discussions, prepared by the Panel Chairman.

WHAT ARE BOTTOMLAND HARDWOODS?

Bottomland hardwood forests occupy the broad floodplains that flank many of the major rivers in the southeastern United States (Figure 1). The Southern bottomland forests encompass about 30.8 million acres from Virginia south to the subtropical hardwood forests of south Florida, west to eastern Texas and Oklahoma, and north up the Mississippi River Valley to southern Illinois and Indiana. In the five southeastern states of Virginia, North and South Carolina, Georgia, and Florida, bottomland hardwood forests are found largely on the Coastal Plain, but also occur on the river and stream margins of the Piedmont. In terms of ownership patterns in these states, about 70% is owned by farms and other private landowners, nearly 25% is owned or leased by the forest industry (largely pulp and paper industries), and only 5% is in public ownership.

The largest single area of bottomland hardwoods occurs in the lower Mississippi Valley. In addition to the mainstem Mississippi River, its tributaries have extensive bottomland areas, including the Arkansas, Red, Quachita, Yazoo, and St. Francis. Other large rivers in the southeast with significant BLH floodplains are the Pearl, Tombigbee, Alabama, Pascagoula, Chattahoochee, Apalachicola, and Suwannee Rivers that drain into the Gulf of Mexico, and the Altamaba, Ogeechee, Santee-Cooper, Pee Dee, Cape Fear, Neuse, and Roanoke Rivers that flow into the Atlantic Ocean.


MO.
KY.
OKLA
TENN.
ARK
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VA
S.C.
MISS
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GA
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LA
FLA
Alluvial bottoms, hammocks, and swamps supporting stands of practically pure hardwoods
Primarily productive upland hardwood sites
Mostly southern pine sites, but with many small productive hardwood areas interspersed
Portions of Appalachian and Ozark hardwood regions, not discussed

Figure 1. Distribution of bottomland hardwood forests in the Southeastern United States.

Because the floodplains occupied by bottomland hardwoods are transitional between permanent water and uplands, they can be elusive to classify. The U.S. Fish and Wildlife Service classifies bottomland hardwoods as forested wetlands. Other terms used to classify this community are seasonally flooded basins or flats, mixed bottomland hardwoods and tupelo-cypress swamps, deep swamp and many others.

The National Wetlands Technical Council and the Corps Waterways Experiment Station have developed a zonal classification of the floodplain forest based on characteristics of soils, hydrology and vegetation (Figure 2). It subdivides the system into six ecological zones provides a standardized framework for differentiating ecological units within bottomland hardwood and forests. This zonal classification is useful in understanding the environmental factors necessary for effective management considerations as shown in Table 1. The U.S. Environmental Protection Agency is now studying its utility in regulatory questions (e.g., jurisdiction and impact assessment).

FLOODPLAIN ENVIRONMENT

Alluvial floodplains are built of deposits of sand, silt, clay and calcareous sediments laid down by a river during flood stage. Over geological time, a river meanders accross the entire floodplain reworking the sediments. As a result, floodplains are generally flat, but numerous minor physical features of relief create differences in drainage and hydroperiod. The low topographic relief of the floodplain landscape is deceptive; a matter of inches in elevation may produce distinct differences in ecological communities. The result is a complex arrangement of wet soils and biotic communities.

The physical features of floodplains are distinctive and are shaped by water processes. Natural levees are formed during periods of overbank flooding. As waters spread out over the floodplain, the current abruptly slackens and suspended sands and silts are deposited (as a levee) immediately adjacent and parallel to the channel. Levees have well drained soils and slope gently down (away from the river) to backswamps where finer silts and clays are deposited. Some large rivers like the Mississippi have levees that can be a mile wide, while smaller rivers generally have levees that may be 100-300 feet across.

The floodplain area between the levee and the valley wall is often called ambiguously a "back swamp" or a "flat," where elevational relief is limited to minor depressions and almost

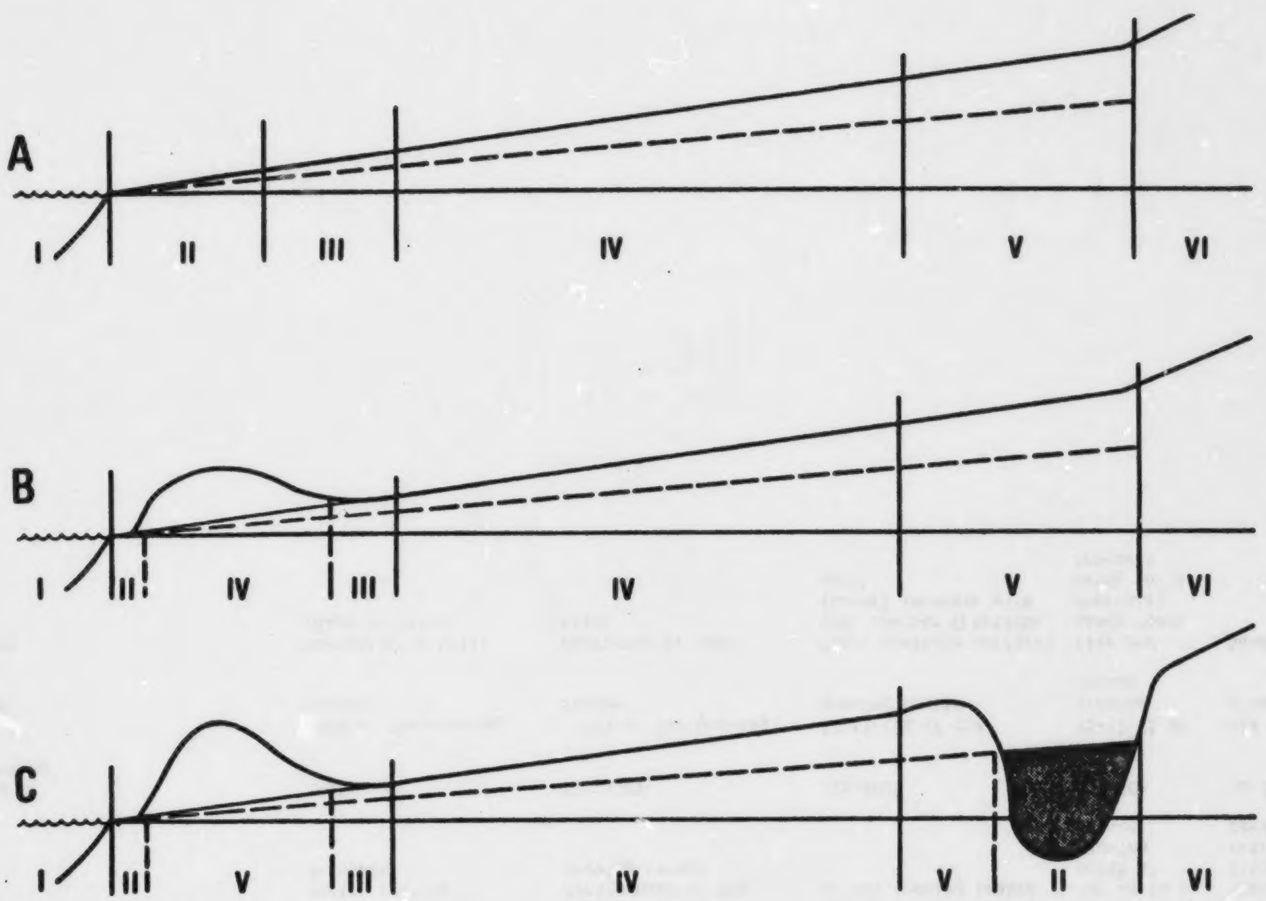

Figure 2. (A) An idealized sequence of NWTC bottomland hardwood zones from a water body to an upland, along a moisture continuum (dotted line represents the depth of the water table). (B) One-half of a floodplain, from mid-alluvial river to bluff, indicates modification of the idealized sequence by the intrusion of a natural levee between Zones II and III. If low enough, the levee may bear Zones II and III; if higher, Zone IV, and higher still, Zone V (C). (C) Further modification of the idealized sequence by inclusion of an abandoned river channel (filled with a clay plug and/or peat).

Table 6. Physicochemical characteristics of floodplain soils by National Wetland Technical Council (NWTC) Zones (partially derived from Clark and Benforado 1981). Zone I (permanent water courses) is excluded from this table.

Characteristic	Zones II	 III	 IV	 V	 VI
Degree of inundation and saturation	Intermittently exposed; nearly permanent inundation and saturation	Semipermanently inundated or saturated	Seasonally inundated or saturated	Temporarily inundated or saturated	Intermittently inundated or saturated
Timing of flooding	Year-round except during extreme droughts	Spring and summer during most of the growing season	Spring for 1-2 months of the growing season	Periodically for up to 1 month of growing season	During exceptionally high floods or extreme wet periods
Probability of annual flooding[a]	100%	51%-100%	51%-100%	10%-50%	1%-20%
Duration of flooding	100% of the growing season	>25% of the growing season	12.5%-25% of the growing season	2%-12.5% of growing season	<2% of the growing season
Soil texture	Dominated by silty clays or sands	Dominated by dense clays	Clays dominate surface; some coarser fractions (sands) increase with depth	Clay and sandy loams dominate; sandy soils frequent	Sands to clays

imperceptable rises. The soils in these areas are comprised of clays and fine silts which, together with flat topography, significantly impede water drainage. Over long periods of time as the river meanders across the floodplain, a series of remnant levees are left behind which form a series of ridges with intervening depressions or swales. Ridge-swale topography is a common feature of larger floodplains which consists of bands of higher, better drained sites mixed together with wet and poorly drained sites.

HYDROLOGY

Water is the driving force of the bottomland hardwood communities and flooding is a vital feature in the maintenance of these wetland systems. Sources of water to bottomlands includes precipitation, overbank flooding, and groundwater. The timing and duration of innundation or soil saturation events (i.e., hydroperiod) are keys to bottomland forest community development. Headwater and backwater flooding, side flooding from tributaries, tides rains and groundwater fluctuations govern hydroperiods. The topographic character of a site and the magnitude of these water fluctuations define the duration, extent and type of innundation or soil saturation. In addition, the nature of the soil has an important effect on the wetness of an area -- heavy clays drain much more slowly than coarsely textured materials and the effect of saturation therefore persists longer in clay soils.

Understanding the annual flooding cycle is critical to understanding the functioning of bottomland hardwoods. During low river stages the forest acts as a buffer between the mesic uplands and the river. Rainfall on the watershed is efficiently absorbed by the litter-covered forest floor. Evapotranspiration rates are high so that runoff through the forest is generally kept at a minimum. Runoff from adjacent uplands flowing across the riparian forest is purified by removal of inorganic nutrients, eroded sediments, and other materials such as agricultural pesticides.

During periods of flood, the floodplain ecosystem acts as a storage reservoir for excess water that spills out of the channel. This reduces river stages downstream. Bottomland hardwood ecosystems are adapted to and depends on periodic flooding. For the plants and animals adapted to riparian habitats, the periodic flooding and flushing by floodwaters from adjacent streams provides an energy pulse which brings in inorganic nutrients to stimulate plant production, improving habitat diversity for deer, squirrels, raccons, and other consumers. It also provides a habitat for spawning fish and improves water quality of the adjacent stream.

STATUS AND LOSS RATE

Nearly 90% of the 11 million acres of wetlands destroyed nationwide between the mid-1950's and mid-1970's, were lost to agricultural development. Agriculture had its greatest impact on forested wetlands, where losses totaled about six million acres, most of which occured in the lower Mississippi Valley states of Louisiana, Mississippi and Arkansas. Federal flood control projects and small watershed projects have accelarated wetland conversion to cropland, expecially from the 1950's to the present.

Only 20% of the original bottomland hardwood forest in the lower Mississippi Aluvial Plain remain and the U.S. Army Corps of Engineers estimated that 1.2% of the remaining bottomland forest is currently being lost annually. Although the dryer parts of the forest are generally cleared first, wetland losses in this region are startling. For example, Louisiana's forested wetlands have declined 50% and current loss rates high; 98% of southern bottomland swamps in Illinois have been destroyed. The bottomland hardwood wetlands on the Atlantic Coastal Plain -- Florida, Georgia, North Carolina, South Carolina, Virginia -- have not been converted at such a rapid rate, but accelerated clearing and drainage is a present threat.

Historically, cotton and corn were the primary crops raised on cleared bottomland hardwoods, but since the mid-1950's soybeans have dominated. Unlike other crops, soybeans have a very short growing season, so they can be planted in areas that remain flooded until June and can tolerate a variety of soil conditions. Heavy foreign demand for soybeans has made it a lucrative cash crop, and, economically, timber production in a natural system cannot complete. Besides conversion to agriculture, other significant impacts on bottomland hardwoods have been conversion to tree-farm monoculture and catfish farms, construction of impoundments, diversion channels, dredging and shortening of channels.

FEDERAL REGULATION

The federal regulatory role in protecting bottomland hardwoods lies in the wetter portion of the system which falls in the jurisdiction of the Clean Water Act. The objective of the Clean Water Act is "to restore and maintain the chemical, physical and biological integrity of the Nation's waters" and the Act emphasizes the functions that wetlands serve. Bottomland hardwoods perform a variety of functions that relate to these goals:

- Water Quality Maintenance. Bottomland hardwoods serve as natural filters that absorb nonpoint pollutants throughout the year and purify river waters by removing suspended solids and other pollutants during flood stage.

- Habitat. The cycles of wetness and dryness in bottomland hardwoods foster a rich and intricate mosaic of habitats for a wide range of aquatic and terrestrial animals.

- Foodchain (detrital export). Food chains in bottomland hardwoods can be divided into dry and wet system pathways. The wet system functions in pools and during inundation and involves bulk export of detritus into sloughs, oxbows and rivers, where it forms the base of the aquatic foodchain.

- Flood control. Bottomland hardwood ecosystems play a major role in controlling downstream flooding - flood peaks do not get as high nor do they rise as rapidly when these systems are intact.

- Human Use. Recreational and commercial values of bottomland hardwoods include timber production, sport fishing and hunting, and commercial fisheries (e.g., in Louisiana, ten mission pounds of red swamp crawdads are harvested annually).

The values of bottomland hardwoods beyond obvious direct economic uses by landowners, such as timber harvest and hunting, have only recently been documented. Studies on the Appalachicola River in Florida have shown that the infrequent pulses of detritus from the bottomland hardwood system supports the important shellfish industry to Appalachicola Bay. Migratory songbirds along the Mississippi Flyway use the coastal bottomland hardwoods in the fall to build up fat reserves which enables them to complete their nonstop flight across the Gulf of Mexico. In recent years scientists have focused on quantifying wetland functions, and are now developing assessment techniques for determining what functions occur at a given wetland site. It is likely that the additional research on the functioning of the systems will help increase public awareness of why undisturbed bottomland hardwoods are beneficial not just to a landowner, but to the public.

EPA's 404 PROGRAM

EPA has recently responded to the landmark court decision in Avoyelles Sportsmen's League, Inc. v Marsh, issued in September 26, 1983. The outcome of this drawn out litigation over landclearing on a 20,000 acre forested tract on the Red River in Avoyelles Parish, Louisiana, provides a legal foundation for asserting EPA's Section 404 Clean Water Act responsibilities.

The background of the case is as follows: In 1978, the Corps and EPA were sued for failing to regulate all of the tract under Section 404. Plaintiffs felt that the tract was a wetland within the scope of the Act and that landclearing activities of the private defendants required a 404 permit.

In September of 1983, the Fifth Circuit Court of Appeals in its Avoyelles decision held that EPA's wetland determination (which identified approximately 80% of the tract as wetland) was within the regulatory definition of "wetlands" and that the land clearing operation on the tract were discharges regulated under Section 404.

EPA issued interim guidance in October 1984 to its regional offices that summarizes the Avoyelles decision and outlines current agency policy on geographic and activities jurisdiction in bottomland hardwoods. In terms of 404 jurisdiction, the guidance is based on consensus among scientists that the most scientifically sound approach in bottomland hardwoods is a "multiple parameter approach" that uses (facultative) plants, soils and hyrdorlogy. The Avoyelles decision ratified this approach and Corps research conducted at the Waterways Experiment Station have developed it into an operational field tool. In terms of what activities require a 404 permit, the guidance is based on the recognition that landclearing operations that occur in BLH wetlands involve considerable scraping and redeposit of soil, and often require subsequent drainage to avoid crop loss from flooding. The Fifth Circuit found that the landclearing operation in the Avoyelles case, which is typical in terms of equipment used and environmental conditions, resulted in a regulated discharge under section 404. The EPA regions are now developing plans to implement the guidance.

FORESTRY IN BOTTOMLAND HARDWOODS

The inherent productivity of floodplain forests makes them particularly well suited to sustain intensive forest production. There is an increasing demand for forest products in the south. But unlike agriculture, where the forest system is removed, there is a potential compatibiliity between protecting the natural functions of bottomland hardwoods and management for timber. The wood fiber of the bottomland hardwoods as an essential part of forest industry's material resource and thus the industry is not interested in converting bottomlands to other uses.

Industry has not always been a good steward of the bottomland resource. Poor exploitive management practices such as highgrading (i.e., taking out only the best material and leaving the rest) have left parts of the southern bottomland hardwood forests in a deteriorated condition. Volume and quality of sawtimber is on the decline, and much of the acreage requires intensive cultural work and seen some needs clearcutting and a new start. The decline is most dramatically in the thousands of acres of worthless blue beach and ironwood stands that once were magnificent bottomland hardwood forests. The rehabilitation of the bottomland hardwoods represents not only one of the most pressing problems facing the wood-using industry, but also perhaps the most exciting and challenging management opportunity.

It is likely that the bottomland hardwood forests will play a much more important role in supplying the predicted demand for wood fiber products. Industry can no longer afford to neglect and abuse one-half of its vital natural resource and must continue to improve its management practices.

Silvicultural Practices

In order to bring about the needed changes in the management of bottomland hardwood forests, the industry has examined a variety of management options. Textbooks on silviculture contain many elegant practices, but most practicing foresters agree that there are in fact only two practical silvicultural systems appropriate for the establishment and maintenance of bottomland hardwood forests: clearcut and plant, or clearcut and natural regeneration. For those industries that depend heavily on hardwood fiber for their products, intensively managed hardwood plantations offer an expensive, but effective alternative. However, today there are no more than one or two companies in the Southeast who practice this method and no more than five thousand acres are being regenerated in this fashion.

By far the most preferred silvicultural system is that of clearcutting and natural regeneration. There are at least 75 commercially important species that grow well within the hardwood forest--all of them are shade intolerant and require full sunlight to reproduce and grow. Thus, the best way to regenerate a mature bottomland hardwood forest is to cut it clear (i.e., cutting down every stem that is more than two inches in diameter). If a full amd complete clearcut is made, most of the stumps will sprout to provide the new forest. About 75 of all new regeneration is of sprout origin; the rest comes from seed. In most cases natural regeneration will result in too many rather than too few stems (e.g., stem counts of 50,000 trees per acre are not uncommon) and some stocking control measures may have to be applied.

Almost any size opening will result in a satisfactory initial reproduction, but subsequent growth and development is strongly influenced by the size of the clearcut. The larger the opening, the smaller the perimeter is in relation to the exposed area, and thus fewer trees will be affected by shade and competition from the surrounding stand. On small tracts these openings may be only three to five acres in size; on large timber tracts they may measure up to 50 acres. In any case, the openings should be large enough to be recognizable as distinct stands in order to simplify subsequent inventories, cultural treatment, and harvesting.

It is the industry's position that a well managed bottomland hardwood forest, including the mosaic of clearcut patches, is the best way to perpetuate the resource, provide tangible benefits in terms of usable fiber, as well as the intangible amenity values of good wildlife habitat and recreation. And finally, the maintenance of a vigorous and healthy bottomland forest preserves the very important hydrologic function of the bottomlands.

CONVERSION OF WETLANDS TO AGRICULTURE IN GEORGIA

Since the mid 1950's, agriculture in the southern states has grown.about four times faster than the rest of the country. Most of this increased production has been soybeans. This section examines the role of agriculture and the U.S. Soil Conservation Service in conversion of bottomland hardwood wetlands to farming in Georgia. Although the clearing of bottomland hardwoods in Georgia is occurring at a slower rate than Mississippi Valley states, the issues are the same.

There are about four million acres of wetlands in Georgia; 80% are in the Southern Coastal Plain and the Atlantic Coast Flatwoods regions in south Georgia and 20% occur in north Georgia above the Fall line. Statewide, about 12,000 acres of wetlands (some bottomland hardwoods) are being converted for agricultural, urban, industrial, transportation, and other uses annually. In agricultural areas, wetlands losses are generally to cropland, pastureland, and pine monoculture in south Georgia and to cropland and pastureland in the northern part of the state.

During the early 1970s, the rising price of oil resulted in trade deficits, and farmers were told to "farm fencerow to fencerow" to supply agricultural products for foreign markets. As a result, marginal, highly erodible land was cleared and brought into production. Drainage was improved on existing cropland. Wetlands were cleared and drained.

Irrigation systems, were installed at a fast pace during the 1970s. Between 1970 and 1981, the irrigated cropland acreage in Georgia grew from under 100,000 acres to over 1,000,000 acres. The primary system installed was the center-pivot system, which, to be economical, require large contiguous acreage (i.e. 200- to 300-acre fields). Small wetland areas, bays, and heads of drains were cleared to facilitate the movement and effectiveness of these systems. Impacts on wetlands when examined as a case-by-case basis are small, but when all fields are considered cumulative impacts are significant.

Crop yields on many drained bottomland hardwood wetland soils are comparable to upland soils, but some wetland soils provide the most productive croplands. In cleared bottomland areas with drainage, corn, grain sorghum, soybeans, vegetables, pasture, and pine trees are grown; without drainage, pastures, pine tree monoculture, and an occasional late-planted soybean or grain sorghum crop is possible.

Landclearing and the conversion of woodlands to cropland has decreased in Georgia, due in part to economics. The expense of farming, landclearing, landleveling, and drainage, coupled with low prices for farm products, has slowed the landclearing trend. The average cost of drainage is about $600 per acre, excluding the cost of outlets, pumping stations, and surface drainage.

ROLE OF THE SOIL CONSERVATION SERVICE

The Soil Conservation Service (SCS) supports the proposition that wetlands should be preserved and managed in ways that are in balance with the Nation's total needs. The policy, procedures, and actions of the agency reflect this position. Although landowners may voluntarily participate in SCS programs, they cannot be forced to do anything. SCS attempts to guide their decisions through on-site technical assistance in developing conservation plans and applying conservation practices. Over the years, SCS has responded to public concerns. The first of many policy statements on wildlife habitat conservation came out in 1935--the year SCS became an agency.

SCS still uses U.S. Fish and Wildlife Circular 39 to classify wetlands. Under present policy, no SCS assistance is provided on construction in wetland classes 3-20 except when the State

Conservationist grants written exemptions on a case-by-case basis. Also, SCS assistance within classes 1 and 2 (which includes less frequently flooded bottomland hardwoods) is available only under certain criteria. An environmental evaluation is required in all of the above-mentioned cases.

The conversion of wetlands has decreased in Georgia during the past few years and one of the reasons is that irrigation acreage growth has increased by less than one percent annually since 1981. But as the world population increases, additional conversion of wetlands to cropland will probably take place, particularly on types 1 and 2.

ECONOMIC INCENTIVES FOR CONVERSION TO AGRICULTURE

There is considerable interest in land use issues related to bottomland hardwood habitat, particularly why land use conversion takes place. The primary alternative use for these forests is agriculture and it appears that conversion occurs largely in response to economic incentives. Discussed below are the market forces providing incentives for conversion, the additional economic incentives for conversion provided by public policy, and alternative public policy actions that could be used to offset existing conversion incentives.

Market Forces

Much of the bottomland hardwood acreage converted to farmland in recent years is now being used to produce soybeans. A 1974 Forest Service timber resource survey in Louisiana alluvial counties showed that 80 percent of the bottomland hardwood forest acreage cleared for agriculture was devoted to soybeans. This is largely due to what was until recently a growing export market for soybeans. Also, soybeans are particularly well suited for production in low lying areas because they can be planted until late June in areas subject to spring flooding.

Comparing the economic returns to soybean farming to the returns to timber production, it is clear why private landowners have opted for such land use changes. An intensive study from the late 1970's reported that per acre economic returns to soybean production were about twice that for timber production. More recent data suggest that the difference in returns may be less, but soybeans will likely continue to be more profitable than timber in the future.

PUBLIC POLICIES MAY ENCOURAGE CONVERSION

In addition to the private economic incentives for conversion, there are a number of existing public policies which appear to make conversion more profitable for landowners than would otherwise be the case. While there has been very little empirical research on these public policy effects, economic theory suggests several hypotheses:

- Price support programs. Price support programs provide minimum price and income levels for a number of major crops. Although soybeans have only a normally effective price support program, there have been levels of price supports for wheat and rice, which are frequently grown in rotation with soybeans. By raising expected farm income and reducing price and income variability, price support programs likely make individuals more willing to invest inland clearing and make lenders more willing to provide financing for such clearing.

- Crop insurance. Crop insurance was expanded in 1980 to become the major form of publicly subsidized disaster production for farmers. Federal crop insurance insures farmers against yield losses from a number of natural causes, including flooding. This risk reduction probably encourages more farming in flood prone areas.

- Low interest loans. Low interest loans are available to farmers through the Farmers Home Administration and the Small Business Administration. By lowering the cost of capital, these programs increase the demand for farmland and may raise the incentives to convert bottomland forests.

- Income tax policy. The income tax code allows farmers and corporations to reduce their conversion costs. In addition to the tax credits and depreciation available for other types of investments, current tax law allows specific deductions for land clearing and drainage costs (U.S. Department of the Treasury).

- Drainage and flood control. Drainage and flood control projects of the Soil Conservation Service and Crops of Engineers increase the productivity of low lying farmland by improving drainage and reduce the risk of flood damage to crops. There is good evidence that drainage and flood control projects often preceed the conversion of bottomland forests to cropland.

More research is needed to establish the extent of these policy impacts on the converstion process.

Public Policies To Reduce Conversion Incentives

If the public wants to reduce the conversion incentives provided by market and policy forces, there are several measures which could be taken. However, there would first need to be a clear statement of goals from Congress. If policy goals are articulated, there are a number of policy changes which could be implemented.

1. Farm program benefits could be denied for land newly converted from bottomland forests. There is a precedent for this in the Sodbuster Bill which in the last year was passed by both houses of Congress but never got out of conference committee. The Sodbuster Bill would prevent farmers from receiving price supports, crop insurance, and government loans in connection with farming fragile land recently brought into production.

2. Another action would be to reform the tax code to eliminate deductions which favor conversion.

3. A third action would be to provide incentive payments or tax credits which would help offset the foregone income of those who do not convert.

4. A forth option would be outright purchase of bottomland hardwood forests by federal and state governments or groups such as the Nature Conservancy. There is already considerable use being made of this option (e.g., the Pascagoula River tract in southeast Mississippi and the Lower Hatchie River Bottomlands area Tennessee).

5. A cheaper alternative to land purchase would be the purchase of development rights which would leave the land in private hands while compensating landowners for voluntarily giving up the right to alter their land use.

6. A regulatory approach could be taken which would prohibit further conversions by taking a social rather than private accounting stance. Conversions might be disallowed as long as there were alternative non-bottomland sites available which would enable farmers to earn a reasonable rate of return. However, a regulatory approach alone might do nothing more than offset some of the other policy impacts discussed earlier.

CONCLUSIONS

Market forces encourage the conversion of bottomland forests to farmland for producing soybeans and other crops. It is likely that a variety of public programs reinforce these market incentives by making it more profitable or less risky to clear and drain the forests. Congress recently appropriated funds for the Department of the Interior to study wetland losses and the role of Federal programs in reducing these losses. The focus will be on bottomland hardwoods of the lower Mississippi Valley. The study will culminate in a report to Congress recommending management alternatives which the Federal government can undertake to preserve wetlands.

WORKSHOP C

A CASE STUDY OF THE APPLICATION OF BOTTOMLAND HARDWOODS COMMUNITY MODELS

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LEONARD PEARLSTINE

LEONARD PEARLSTINE is employed as an ecosystems modeler at NCET through an Intergovernmental Personnel Act agreement with the University of South Carolina. He earned his master's degreee in a project that involves a "net energy analysis" of the Santee/Cooper Rediversion Project which is the subject of the following paper. Mr. Pearlstine is the author of the succession simulation model (FORFLO) that was used in this study. He is currently involved in the application of FORFLO and the production of similar models for other wetlands.

EXECUTIVE SUMMARY

DEVELOPMENT OF A BOTTOMLAND FOREST SUCCESSION SIMULATION MODEL AND ITS APPLICATION TO THE SANTEE-COOPER RIVER REDIVERSION PROJECT, S. C.

prepared by

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and

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INTRODUCTION

The U. S. Fish and Wildlife Service is developing and using several methodologies to assist the resource manager in accurately anticipating the consequences of development or environmental management decisions. They include publications that synthesize ecological information at the broad regional level (Characterizations), at the specific estuarine system level (Estuarine Profiles), and at the community/habitat level (Community Profiles). Technological aids range from computerized cartography (the Map Overlay and Statistical System and the Cartographic Output System) to computerized species-response curve indices (the Habitat Evaluation Procedure). One of the latest technologies to be developed at the Fish and Wildlife Service is the use of mathematical modeling to predict community or habitat succession resulting from an environmental impact.

Objectives

This report reviews the development and application of a bottomland forest succession model (FORFLO). The objectives of this application are to be able (1) to synthesize tree species growth responses and interactions at the ecosystems level, (2) to predict the impacts of a changing waterflow regime on tree species composition, and (3) to complement Habitat Suitability Indices by providing future forecasts of canopy closure, mast production, and other variables which depend on forest successional stage and are used by the indices.

Applications

To examine its effectiveness and practical application, the FORFLO model was used to predict the consequences resulting from a river diversion impacting a floodplain forest community in South Carolina. The results of that study are reviewed in this report. In addition, FORFLO is currently being implemented along the Lower Atchafalaya River, Louisiana, where a combination of river building, natural subsidence, and levee construction by the U. S. Army Corps of Engineers complicates predictions of species change. FORFLO will also soon be implemented to assist management decisions in the greentree reservoir at Felsenthal National Refuge in Arkansas.

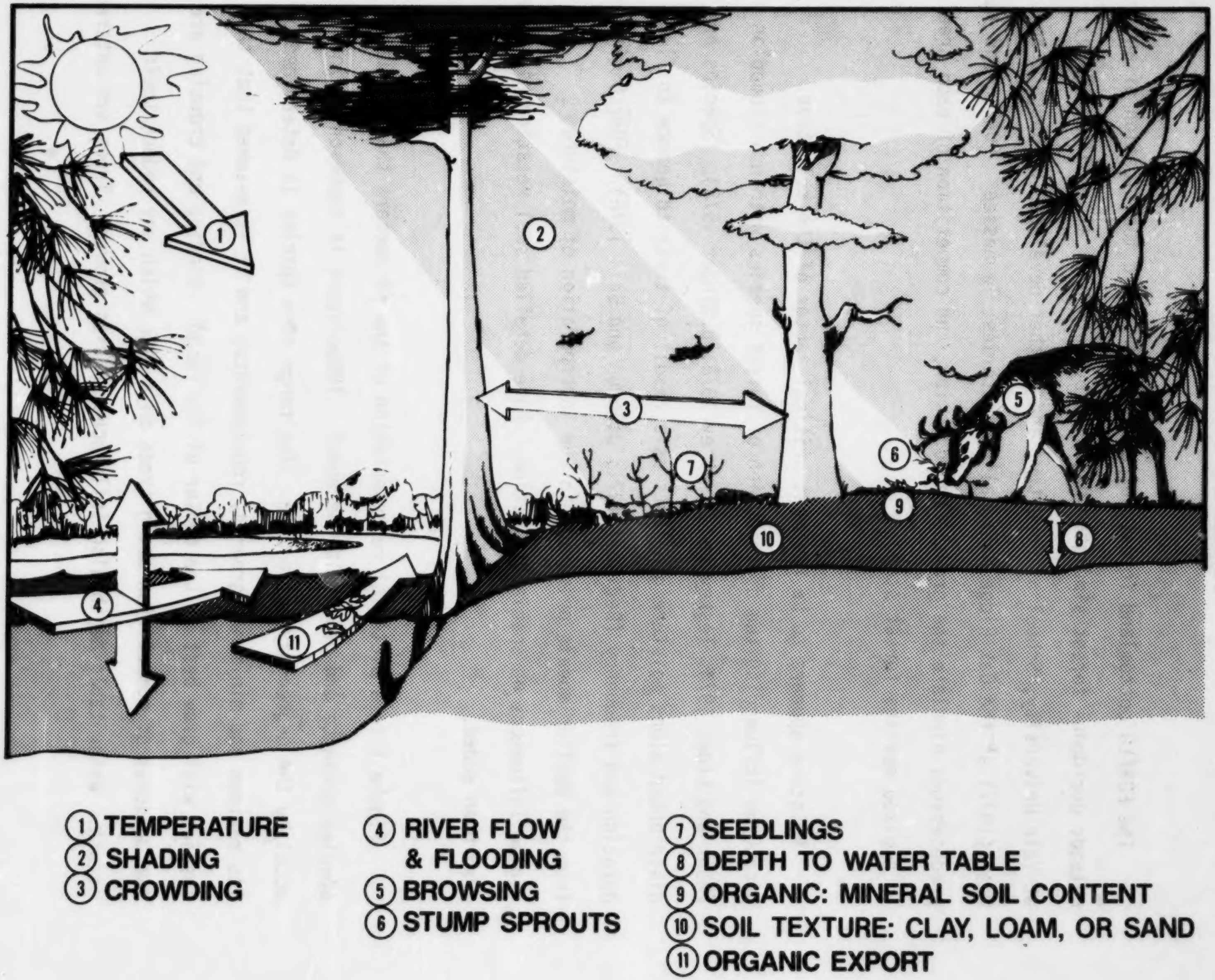
DEVELOPMENT OF THE MODEL

The FORFLO bottomland forest succession model is a modification of an uplands deciduous forest simulator designed by Botkin et al. (1972a, 1972b) at Yale University, School of Forestry, and further developed by Shugart and West (1977) at the Oak Ridge National Laboratories, Tennessee. FORFLO and its predecessors simulate the growth, reproduction, and competition of each tree in a mixed species forest stand.

Moisture appears to be the most critical factor of the selective pressures influencing the distribution of forest species within a floodplan (Hook and Brown 1973; Teskey and Hinckley 1978; Bedinger 1978). Species are distributed along moisture gradients as a result of their tolerance to flood duration and frequency (Bedinger 1971; Johnson and Bell 1976). FORFLO differs from the earlier models primarily in the incorporation of moisture regime influences on species selection. More detailed soil relationships have also been added.

Figure 1 is a pictorial representation of the parameters that influence species presence and growth in the model. Temperature is represented in the model by the degree-days of a site. The range of a species is determined by its maximum and minimum degree-day requirements, and it is assumed that the species will grow best at the center of its range. Shading and crowding are two measures of competition among trees on a site which may reduce their growth. Water table depth also influences species growth. Trees are entered

FIGURE 1.
BOTTOMLAND FOREST MODELLING INTERACTIONS


①
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⑥
⑦
⑧
⑨
⑩
⑪
① TEMPERATURE
② SHADING
③ CROWDING
④ RIVER FLOW & FLOODING
⑤ BROWSING
⑥ STUMP SPROUTS
⑦ SEEDLINGS
⑧ DEPTH TO WATER TABLE
⑨ ORGANIC: MINERAL SOIL CONTENT
⑩ SOIL TEXTURE: CLAY, LOAM, OR SAND
⑪ ORGANIC EXPORT

into the model either as seedlings or sprouts. Flood duration, browsing, and soil variables reduce or enhance successful recruitment. A tree's probability of dying increases as that tree approaches the maximum age for the species. Trees also have a high probability of death in the model when their growth slows to less than 10% of the species optimum growth at the same age. The model tracks the species, diameter-breast-height (DBH), and age of each tree on the simulated plot from the time the tree enters the plot as a seedling or sprout until it is "killed."

Depth to the water table or height and duration of flooding on a site is calculated from detailed elevation data from the study area and from an equation relating river flow to water stage. For the Santee-Cooper River Rediversion study, elevation data were obtained from 15-minute and 7.5-minute USGS quadrangles containing the study area (Figure 2), the U. S. Coast and Geodetic Survey, and the U. S. Army Corps of Engineers (floodplain cross-sections, bank-to-bank profiles, and logging road traverses). An equation to determine river stage at any location in the Santee flooplain study area was derived from U. S. Army Corps of Engineers hydrographs relating river flow to river stage at both ends of the study area.

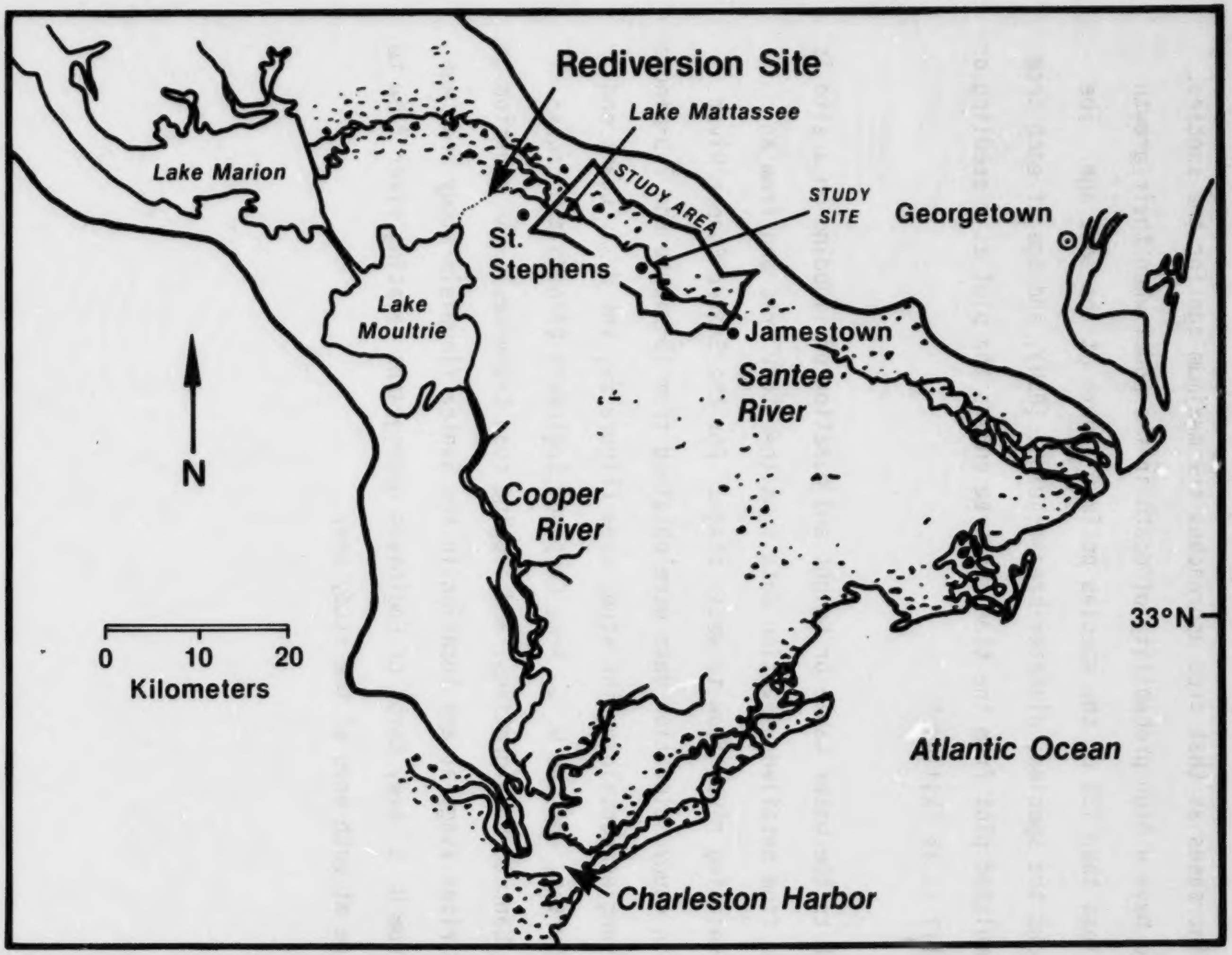

Rediversion Site
Lake Mattassee
STUDY AREA
STUDY SITE
Georgetown
Lake Marion
St. Stephens
Lake Moultrie
Jamestown
Santee River
N
Cooper River
0
10
20
Kilometers
33°N
Atlantic Ocean
Charleston Harbor

FIGURE 2.
Location Map

A CASE STUDY OF WATER CONTROL OPTIONS FOR THE SANTEE-COOPER RIVER REDIVERSION, S. C.

Hydrological regimes of the Santee River currently and after the rediversion were applied to the FORFLO model to test its effectiveness and demonstrate its usefulness to the resource manager.

Diversion

The Santee River, South Carolina, was once the fourth largest river on the east coast with average annual flows of 17,500 cubic feet per second (cfs). In 1941 the South Carolina Public Service Authority diverted 88% of the Santee's flow through two newly created lakes and into the Cooper River in order to develop hydroelectric power potential (Figure 2). After the 1941 diversion the Cooper River had a discharge of approximately 150 times its former flow rate, and the Santee River carried only 10% of its former flow.

Diversion Effects

Since the diversion, a bottomland hardwood forest has matured along most of the length of the Santee's oversized floodplain. High flows on the Cooper River after the diversion carry large quantities of sediments which have created shoaling problems in the navigation channels in Charleston Harbor. Maintenance of the main navigation channels in the harbor requires intensive year-round dredging. The U. S. Army Corps of Engineers, the South Carolina Ports Authority, and the United States Navy dredge an average total volume of about 10.2 million cubic yards of sediment from the harbor per year (U. S. Army Corps of Engineers 1966). Dredging currently costs about $1.00/yd^3$ (J. Saddler 1981, S. C. Ports Authority, Charleston; personal communication) or $10.2 million dollars per year to maintain Charleston Harbor.

Proposed Rediversion

To alleviate this shoaling problem and the associated dredging cost, the Army Corps of Engineers was authorized by Congress in 1968 to redivert most of the water flow back into the Santee River. The rediversion involves construction of an 18.5-km long canal from Lake Marion back into the Santee River (Figure 2). An additional hydropower plant is being constructed on the rediversion canal near St. Stephen to take advantage of some of the remaining hydrostatic head. For the Cooper River, the Army Corps of Engineers has stipulated (preliminarily) that a weekly average flow of 3,000 cfs must not be exceeded if shoaling in Charleston Harbor is to be effectively reduced (U. S. Army Corps of Engineers 1975). The magnitudes of changes in mean annual discharge patterns between the 1941 diversion project and the planned rediversion are summarized in Table 1.

Table 1. -- Annual Average Flow Regimes for the Santee and Cooper Rivers

TIME	Flow (cfs)*	
	Cooper River	Santee River
Before Diversion in 1941	100	17500
After Diversion	15500	2000
After Planned Rediversion	3000	14500

*cfs = cubic feet/second = 0.0283 m^3/sec.

Effects of Proposed Rediversion

In the first phase of this study, McKellar et al. (1984) examined a wide range of environmental and economic impacts that might result from the rediversion project. Among their findings were (1) possible negative impacts on industrial and municipal water supply along the heavily populated Cooper River, (2) negative impacts to shell fisheries in the Santee River Delta, (3) possible positive impacts on waterfowl in the Santee River deltaic marshes, and (4) some concern about the possible impacts to anadromous fishes. The majority of their study, however, focused on the floodplain forest of the Santee River. The floodplain represents a major ecological feature of the coastal plain which will be impacted by the rediversion. Their studies suggested that the rediversion as planned would inundate much of the Santee floodplain and result in an extensive decline in the bottomland forest.

Modified Rediversion

McKellar et al. suggested that loss of floodplain productivity may be decreased substantially if, during the critical early months of the growing season (April, May, June, July), the power plant on the rediversion canal would be operated with just one of its three turbines. This would allow a maximum of 8,000 cfs to pass through the rediversion canal; the rest of the flow would be shunted to the Cooper River.

Comparison of Rediversion Water-Release Alternatives

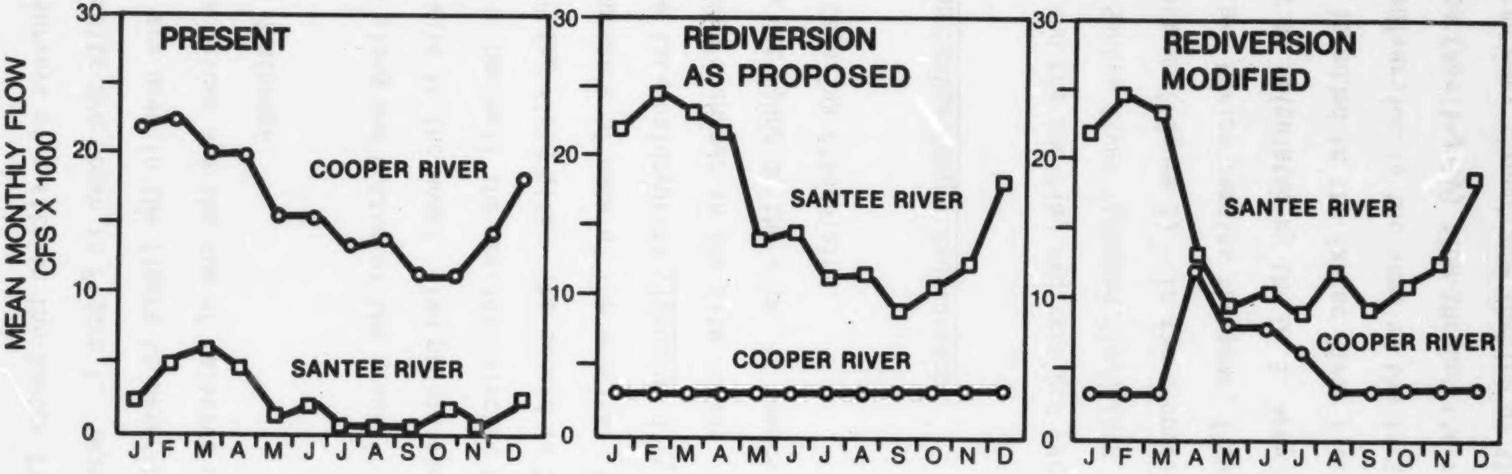
The seasonal patterns of river flow for present conditions and for the rediversion options discussed above are given in Figure 3. These long-term average trends indicate a winter-spring period of high flow and a summer-fall period of low flow. After the rediversion, the Santee River would be returned to within 80% of its original (pre-diversion) flow rate. Seasonal patterns would include both flood stages and periods of low flow. Cooper River flows would be held at a weekly 3,000 cfs average as stipulated by the Corps. The results of the modified rediversion proposed by McKellar et al. would reduce flow to the Santee during the early growing season with a corresponding increase on the Cooper during these months (Figure 3).

In addition to these seasonal trends, there would be large-scale daily and weekly fluctuations caused by peak-demand operation patterns of the new hydroplant. One scenario for water release into the Santee (U. S. Army Corps of Engineers 1976) stipulates a discharge of 24,500 cfs for 15 hr during the day and zero discharge for 9 hr at night. Weekend schedules would be modified to a 5-hr discharge of 16,400 cfs during mid-day with zero discharge for the remainder of the day.

Model Validation on the Santee Floodplain

To test how well the model performs, FORFLO was set up with a species mix wetter than at present, and characteristic of conditions on the Santee floodplain prior to the original diversion. The model was then allowed to simulate conditions through time up to the present. The model results were

FIGURE 3.
SEASONAL DISCHARGE PATTERNS FOR THE SANTEE-COOPER RIVERS



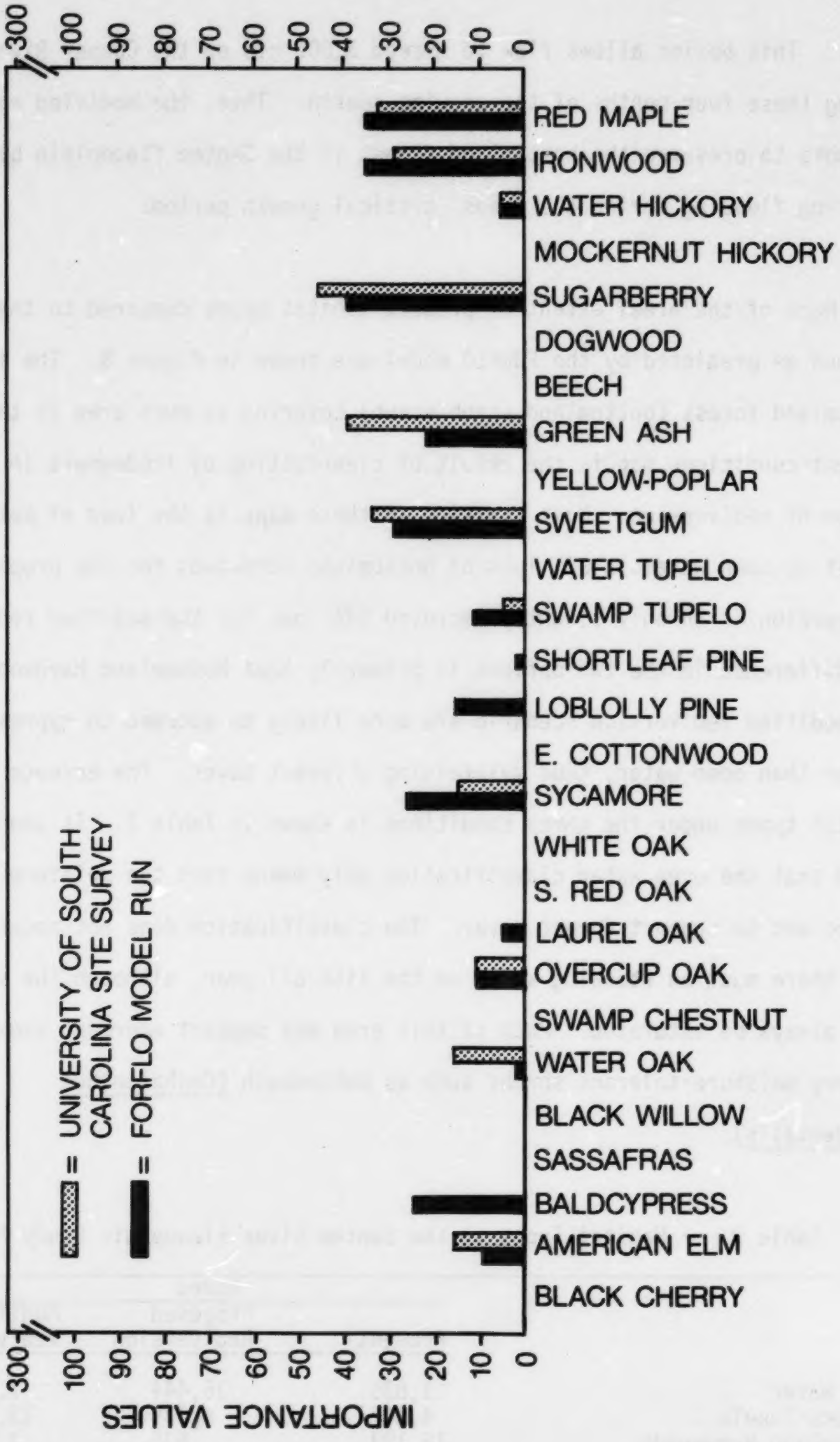
then compared to field surveys of a site on the Santee floodplain (Parks and Williams 1983). The results are shown in Figure 4. Importance values, as given by Curtis (1959), are used in the figure to describe forest composition. Importance values are the sum of relative density, relative frequency, and relative dominance.

The species listed along the bottom of the graph in Figure 4 are all the species that were available to the model. Two points should be observed in the figure. The first is how well the species selected by the model agree with observed species in the field site. The second is how well the model tracks the relative importance of each of the species. From personal observation, however, we know baldcypress (Taxodium distichum) is present on the site although it doesn't appear in the site survey. Also, loblolly pine (Pinus taeda), although not found on the site, is common on plots with similar flood regimes on South Carolina floodplains.

Model Simulations of the Santee-Cooper Rediversion

Both the proposed and the modified rediversions were simulated along a 15.6 mile reach of the Santee River forested floodplain from the rediversion site downstream to Jamestown (Figure 2). In the proposed rediversion, flow to the Santee River from Lake Marion remains the same, flow to the Cooper River is reduced to 3,000 cfs as stipulated by the U. S. Army Corps of Engineers, and the remaining flow is added to the Santee River flow via the rediversion canal. The modified rediversion is the same as the first except that during the early growing season (April-July) flow through the rediversion canal is reduced to that which can pass through one turbine of the power plant on the

FIGURE 4.


IMPORTANCE VALUES
300
100
90
80
70
60
50
40
30
20
10
0
RED MAPLE
IRONWOOD
WATER HICKORY
MOCKERNUT HICKORY
SUGARBERRY
DOGWOOD
BEECH
GREEN ASH
YELLOW-POPLAR
SWEETGUM
WATER TUPELO
SWAMP TUPELO
SHORTLEAF PINE
LOBLOLLY PINE
E. COTTONWOOD
SYCAMORE
WHITE OAK
S. RED OAK
LAUREL OAK
OVERCUP OAK
SWAMP CHESTNUT
WATER OAK
BLACK WILLOW
SASSAFRAS
BALDCYPRESS
AMERICAN ELM
BLACK CHERRY
▨ = UNIVERSITY OF SOUTH CAROLINA SITE SURVEY
■ = FORFLO MODEL RUN

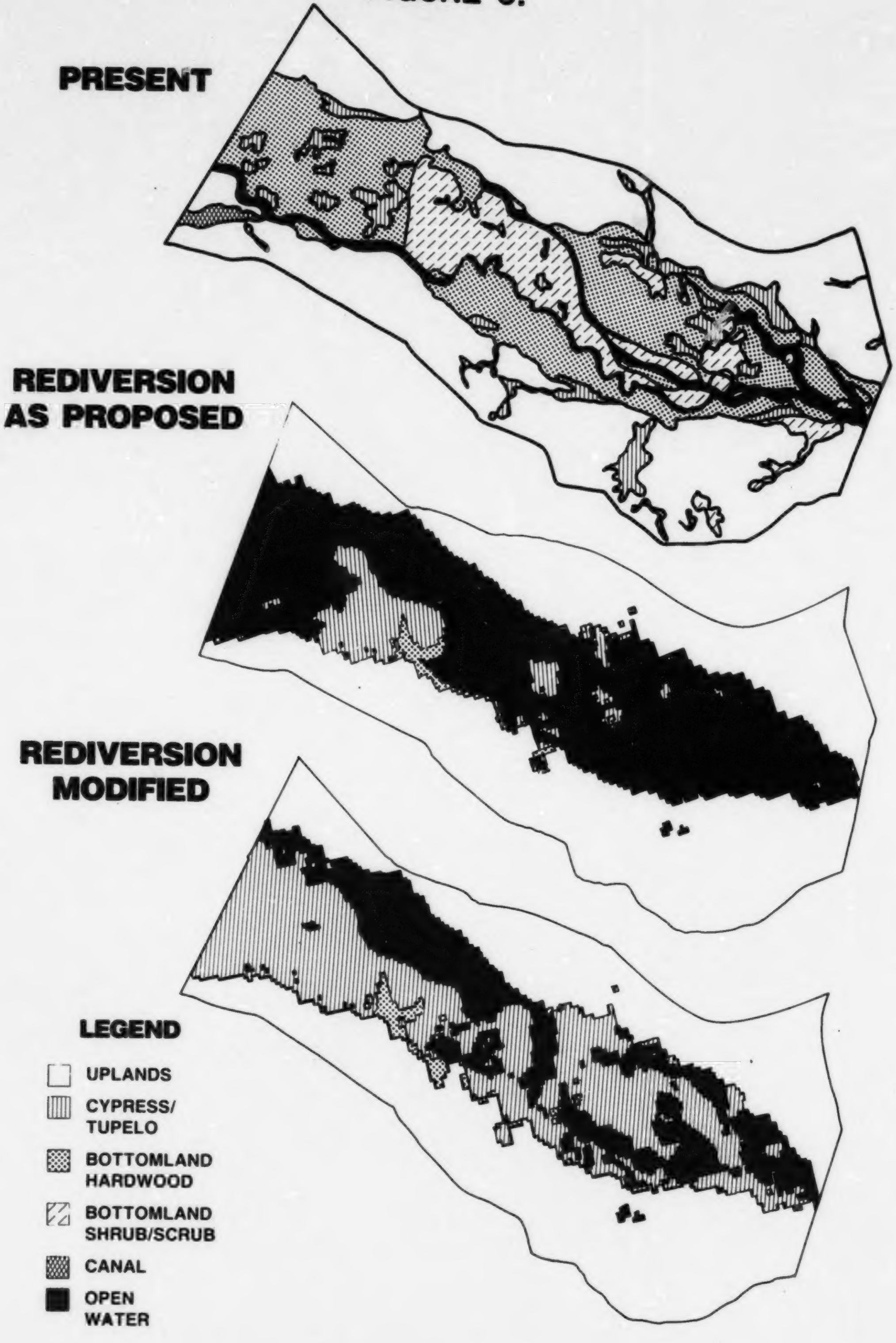
canal. This option allows flow to exceed 3,000 cfs on the Cooper River only during these four months of the growing season. Thus, the modified rediversion attempts to preserve the bottomland forest in the Santee floodplain by reducing flooding during the trees' critical growth period.

Maps of the areal extent of present habitat types compared to the two options as predicted by the FORFLO model are shown in Figure 5. The immature bottomland forest (bottomland shrub/scrub) covering so much area in the present-conditions map is the result of clearcutting by landowners in anticipation of rediversion. Most striking in these maps is the loss of bottomland forest to open water: a 97% loss of bottomland hardwoods for the proposed rediversion or an only slightly improved 94% loss for the modified rediversion. The difference in the two options is primarily that bottomland hardwoods under the modified rediversion scenario are more likely to succeed to cypress-tupelo, rather than open water, thus maintaining a forest cover. The acreage of the habitat types under the three conditions is shown in Table 2. It should be noted that the open water classification only means that the moisture regime is too wet to support forest cover. The classification does not necessarily mean there must be standing water on the site all year, although the soil will always be saturated. Much of this area may support emergent vegetation or very moisture-tolerant shrubs such as buttonbush (Cephalanthus occidentalis).

Table 2. -- Habitat Types in the Santee River Floodplain Study Area

	Acres		
	Present	Proposed Rediversion	Modified Rediversion
Open Water	1,835	16,444	7,561
Cypress-Tupelo	4,847	4,739	13,621
Bottomland Hardwoods	18,193	635	1,030

FIGURE 5.


PRESENT
REDIVERSION AS PROPOSED
REDIVERSION MODIFIED
LEGEND
UPLANDS
CYPRESS/ TUPELO
BOTTOMLAND HARDWOOD
BOTTOMLAND SHRUB/SCRUB
CANAL
OPEN WATER

CONCLUSION

From the two rediversion alternatives examined, the FORFLO model indicated that large tracts of bottomland hardwood habitat would be lost. However, the modified rediversion plan, based on reduced waterflow during the growing season, maintained a forest cover primarily as cypress-tupelo. This project thus demonstrated that mathematical modeling can be successfully employed to synthesize complex ecological relationships for the study of successional trends. The integration in this project of ecological modeling and spatial mapping has provided a valuable tool to the resources manager who needs to forecast the extent of change a floodplain modification may bring about.

The U. S. Fish and Wildlife Service is further extending the capability of the FORFLO model by incorporating the calculation of Habitat Suitability Indices for forest species. This merging of the two technologies will allow for future forecasting of HSI values both temporally and spacially.

Bottomland forest wetlands are ecologically and economically important for wildlife habitat, timber resources, detrital output to downstream marshes, downstream flood mitigation, water quality improvement, and scenic quality. Predictive models such as FORFLO allow resource managers to protect these wetlands currently being stressed nationwide by development and agriculture.

REFERENCES

Bedinger, M.S. 1971. Forest species as indicators of flooding in the lower White River Valley, Arkansas. U.S. Geol. Surv. Prof. Pap. 750-C: C248-253.

Bedinger, M.S. 1978. Relation between forest species and flooding. In P.E. Greeson, J.R. Clark and J. E. Clark, eds. Wetland functions and values: the state of our understanding; American Water Resources Association, Minneapolis, Minn.

Botkin, D.B., J.F. Janak, and J.R. Wallis. 1972a. Rationale, limitations, and assumptions of a northeastern forest growth simulator. IBM J. Res. Develop. 16:101-116.

Botkin, D.B., J.R. Janak, and J.R. Wallis. 1972b. Some ecological consequences of a computer model of forest growth. J. Ecol. 60:849-873.

Curtis, J.T. 1959. The vegetation of Wisconsin and ordination of plant communities. University of Wisconsin Press, Madison. 657 pp.

Hook, D.D., and C.L. Brown 1973. Root adaptations and relative flood tolerance of five hardwood species. For. Sci. 19:225-229.

Johnson, F.L., and D.T. Bell 1976. Plant biomass and net primary production along a flood-freqency gradient in the streamside forest. Casternea 41(2):156-165.

McKellar, H.N., J. Booth, L. Pearlstine, and D. Cowen 1984. Conceptual models and energy analysis of river flow modifications - A case study of water control options for the Santee-Cooper River Rediversion, S.C. Final report to the U. S. Fish and Wildlife Service, National Coastal Ecosystems Team, Slidell, La.

Parks, W., and J. Williams, 1983. Preliminary results of forest stand analysis and litter production estimates: Santee River floodplain forest, 1983. Unpublished paper, University of South Carolina, Department of Environmental Health Sciences, Columbia.

Shugart, H.H., and D.C. West 1977. Development of an Appalachian deciduous forest model and its application to assessment of the impact of the chestnut blight. J. Environ. Manage. 5:161-179.

Teskey, R.O., and T.M. Hinckley 1977. Impact of water level changes on woody riparian and wetland communities. Vol. II: Southern forest region. U. S. Fish and Wildlife Service FWS/OBS-77/59.

U.S. Army Corps of Engineers 1966. Survey report on Cooper River, S.C. (Shoaling in Charleston Harbor). Charleston District, Charleston, S.C.

U.S. Army Corps of Engineers 1975. The final environmental statement, Cooper River rediversion project. Charleston District, Charleston, S.C.

U.S. Army Corps of Engineers 1976. Design Memorandum No. 9. Charleston District, Charleston, S.C.

WORKSHOP D

ENVIRONMENTAL AUDIT

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BENEFITS AND COMPONENTS OF AN ENVIRONMENTAL AUDIT

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Over the past several years the concept of the environmental audit has grown and developed into a major tool for the holistic focusing of many technologies toward a centralized approach to achieving environmental and human protection. This concept possesses several facets which are of importance to both the regulator and regulated communities. Corporate liability awareness for accidental events and long-term pollution effects, financial and organization planning, and personnel matters, as well as regulatory compliance benefits will accrue to the industrial sector, while the regulatory agencies have a mode of monitoring compliance in a potentially less adversary mode.

The fundamental characteristic of environmental audit which industry must recognize and appreciate is that corporate needs, quite independent from environmental policy associated with any given administration and regulations, are served and result in clear influences on business profitability and success.

The following outline is provided as a checklist of why audit through how to audit.

* WHY AUDIT *

- Management Tool
  - Cost-Effective Compliance
  - Risk Management

- Preventing Violations
  - Early Warning Systems
  - Identifying Liabilities
  - Company Compliance Profile
  - Reporting and Recordkeeping

- Plan for Growth
  - New Facilities
    - Siting Constraints
    - Preconstruction Review
  - Plant Modifications
  - Acquiring New Plants
  - Mergers & Spin-Offs
  - Estimating Compliance Costs

- Response to Regulations
  - Permits & Renewals
  - SEC Disclosure Requirements
  - Inspections
  - Enforcement Orders
  - Rulemaking Participation

- Emergencies

- The Intangibles
  - Employee Satisfaction
  - Public Image
  - Community Commitment

* AUDIT PLANNING *

- The Audit Team
  - In-House Expertise
    - Top Management
    - Audit Leader
    - Plant Personnel
    - Engineers
    - Accountants
    - Toxicologists
    - Environmental Scientists
    - Safety Professionals
  - Consultants
    - Special Skills
    - Anticipated Cost
    - Their Contribution
  - Legal Assistance
    - Confidentiality
    - Interpreting Regulations
    - Liabilities
  - Computer
    - Data Analysis
    - Cost Projections
    - Compliance Alternatives

- Scope of Review
  - Strategy
  - Multiple Site Audits
  - Corporate-Wide Audits
  - Components
    - Compliance Profile
    - Cost-Saving Opportunities
    - Management Planning

- Subject Areas
  - Facilities
  - Pollutants
  - Regulatory Requirements
  - Maintenance Procedures
  - Contingency Plans
  - Growth Plans
  - Transportation Methods
  - Risk Factors
  - Personnel Assignments

- Financial Considerations
  - Compliance Costs
  - Tax Incentives
  - Govt. Assistance
  - Accounting Treatment
  - Audit Costs
  - Frequency Determination

* REGULATORY REQUIREMENTS *

- Environmental Controls
  - Clean Water Act
  - Clean Air Act
  - Resource Conservation & Recovery Act
  - Toxic Substances Control Act
  - Superfund
  - Safe Drinking Water
  - Underground Injection
  - OSHA
  - Other Federal Laws
  - State & Local Laws
  - Permit Terms and Schedules
  - Administrative Orders
  - Court Rulings

- On-Site Obligations
  - Air Emissions
  - Water Discharges
  - Land & Facilities
  - Raw Materials
  - Products
  - Wastes
    - Treatment
    - Storage
    - Disposal
  - Underground Injection
  - Transport Vehicles
  - Shipping Facilities
  - Records

* CONDUCTING THE AUDIT *

- Fact Finding
  - Sources
    - Accident Reports
    - Permits & Applications
    - Monitoring Reports
    - Spill Plans
    - Substantial Risk Reporting
    - Product Safety Data
    - Health Effects Data

    - Response Plans
    - Training Programs
    - Shipping Manifests
    - Waste Flow Diagrams
    - Process Information
    - Treatment Technology
    - Financial
    - Citizen Complaints
  - Questionnaires
    - Who
    - What
    - General Facility Information
    - Identify Specifics
    - Follow-Up
  - Interviewing
    - What To Look For
    - On-Site Personnel
    - Consultants
    - Regulatory Personnel
    - Equipment Manufacturers
    - Engineering Advisors
    - Facilities Design Staff
    - Community Groups
    - Finding Hidden Issues
  - Site Visits
    - Benefits
    - Contacts
    - What To Look For
    - Latent Conditions

- Protecting Confidentiality
  - Public Disclosure Risks
  - Attorney/Client Privileges
  - Work Product Doctrine
  - Consultant Reports
  - Effect on R&D Work
  - Submittals To Agencies

- Audit Checklist
  - Products
    - Raw Materials
    - Chemical Substances
    - Volume
    - Characteristics
  - By-Products & Wastes
    - Production
    - Treatment
    - Handling
    - Storage
  - Physical Layout
    - Maps
    - Flow Diagrams
    - Monitoring Points

    - Discharge Points
    - Treatment Areas
    - Storage Areas
    - Disposal Areas
    - Shipping Facilities
  - Regulated Activities
    - Compliance Status
    - Immediate Actions
    - Projected Problems
  - Costs of Control
    - Capital
    - Operating

  - Sampling & Analysis
    - In-house Capability
    - Commercial Laboratories
    - Quality Control
    - Level of Effect

- Points of Discharge
  - Air
    - Stacks & Vents
    - Fugitive Emissions
  - Water
    - Pipes & Conduits
    - Non-Point Run-Off
    - Sewers & Ditches
    - Dilution Issues
  - Land
    - Treatment
    - Storage
    - Disposal
    - Underground Injection
    - Groundwater Leaching
    - Spills
  - Enforcement & Litigation
    - Pending
    - Potential
    - Strategies

- Maintenance Procedures
  - Consistent Routines
  - "Human Error" Factors
  - Training Programs
  - Recording Logs
  - Scheduling Techniques

* USING THE AUDIT *

- Analyzing the Results
  - Organizing
    - Order of Priority

    - Violations
    - Facts vs. Opinions
    - Analytical Team
    - Statistical Approaches
  - Compliance Profile
    - The Multi-Site Company
    - The Single Plant
  - Preparing the Audit Report
    - Compliance Status
    - Cost Estimates
    - Recommendations
  - Presentation to Management
    - Candor
    - Management Targets
  - Record Retention

- Applying the Results
  - Cost Savings
    - Implementation
    - Establishing Priorities
    - Modify vs. Rebuild
    - Heading Off Trouble
  - Management Protection
    - Liability for Employee Acts
    - Potential Criminal Liability
    - Permit Certifications
    - Statutory Reports
  - SEC Disclosures
  - Early Warning Systems
  - Corporate Response Plan
    - Scope & Purpose
    - Staffing
    - Internal Communications
    - External Communications
    - How Much/How Soon
  - Environmental Data Management
    - Computers
    - Follow-Up
  - Acquisitions
    - Limiting Liability
    - Indemnification
    - Responsibility for Clean-Up
  - Mergers & Sales
  - Management Implications
  - Litigation Support
  - Administrative Proceedings
  - Influencing Regulation
  - Public Relations

- Coordinating Compliance
  - EPA/OSHA Inspections
    - Right to Inspect
    - Narrowing the Scope

  - Protecting Your Rights
  - Injunctions & Penalties
  - Contesting the Results
  - Inspection Plans
- Streamlined Reporting
  - Monitoring Reports
  - Recordkeeping
- Obtaining Permits
  - Applications
  - Renewals
  - Procedures
  - Consolidated Permits
  - Efficient Practices
- Risk Management
  - Responsibility Requirements
  - Liability Assessment
  - Insurance
  - Self-Insurance
  - Third Party Liabilities
- Litigation
  - Avoiding
  - Prosecuting
  - Defending
- Regulatory Benefits
  - Going Beyond Compliance
  - Updating

ROGER N. SCHECTER

ROGER N. SCHECTER holds graduate degrees from UNC-Greensboro in Ecology and from UNC-Chapel Hill in Planning and Public Administration. He is a full member of the American Institute of Certified Planners and served as Chapter President for North Carolina. He has fifteen years of experience in environmental planning and management as a consultant and with public agencies. He has worked on water and land resources projects on several nationwide studies, organized the first central permitting office in North Carolina, and prepared numerous reports on environmental issues across the State. Currently, as Director of the Pollution Prevention Pays Program, he is responsible for the planning and development of a unique governmental program in environmental management for multi-media waste reduction.

Roger N. Schecter, Director

Pollution Prevention Pays Program
North Carolina Department of Natural Resources and Community Development
Division of Environmental Management

Thank you for the opportunity to talk about the state's interest in Environmental Auditing and our pollution prevention program. I would like to share with you why the Department of Natural Resources and Community Development is encouraging the use of Environmental Auditing, how auditing fits into our regulatory program, and who in North Carolina is trying auditing now. I will also be discussing the work of our advisory group called the North Carolina Environmental Auditing Roundtable. First, let me say that the department's policy is to encourage economic development -- just as long as it does not harm the environment. In the work of the NC 2000 report, our natural resources are both a primary foundation for our economy and a rich natural heritage. I believe that we all -- state government, private industry, local government and citizens -- recognize our stewardship obligation toward North Carolina's natural resources.

But meeting that stewardship obligation is a whole lot harder than just recognizing it. With the proliferation and complexity of environmental standards and regulations, it is no easy job for industries and local governments to comply with their environmental responsibilities. For one thing, most of those responsibilities are relatively new. The North Carolina General Assembly, like other legislatures around the country, passed environmental laws in large numbers in the 1970's. For another thing, those responsibilities are constantly changing and increasing. Also, these laws focus on disposal or discharge of wastes, an end-of-the-pipe.

A look at activity in the Department over the last year bears this out. The restrictive nutrient-sensitive classification was placed on two major lakes, Falls and Jordan. A statewide system of classification for groundwater moved toward its effective date in December. And, our Division of Environmental Management continued its work to solve a newly-discovered problem involving the misuse and mislabeling of toxic chemicals called biocides.

The point is this: Management of these obligations is tough for the people we regulate. In environmental auditing, we have an effective internal tool that managers in industry and local government can use to get the job done. We consider environmental auditing as a form of self-help that is good business, that protects the environment, and that prevents a regulatory agency like NRCD from having to step in.

Because of its value, our Department is encouraging the use of auditing through a program of information and assistance. We do not plan to offer incentives such as reduced fines or reduced inspections to people who use auditing programs. There are two reasons: First, auditing is an inherently sound concept that has produced results in the private sector. In other words, auditing has been proven to work in the absence of such incentives. Second, incentives amount to a form of governmental intervention. They raise questions about the ultimate direction of an agency's auditing program. On the bottom line, we believe that we should let auditing continue as it began - as a private industry initiative.

The Department's aim is to act as a catalyst. You are already familiar with many of the environmental laws administered by NRCD. They include the Water Pollution Control Law, the Air Pollution Control Law, the Oil and Hazardous Substance Pollution Control Law, the Mining Act, the Coastal Area Management Act, and the Sedimentation Pollution Control Act.

To administer the Natural Resource Laws, we seek a balance between regulatory actions that deter violations and agency steps·that encourage compliance. On the one hand, we believe that an active enforcement program will always be required. It will be required to keep faith with the people who go to the trouble and expense to comply with the laws. It will also be necessary to deal with the small number of recalcitrant people who refuse to comply. On the other hand, an agency like ours has a responsibility to help and encourage people to comply. We recognize that most people want to do the right thing, we realize also, that our resources are scarce.

At most, we can deal with a small number of violators. The catalyst role concerning auditing and prevention of pollution helps us balance the equation between deterrence and encouragement.

Indeed, our goal is to achieve higher levels of Voluntary Compliance. One unusual aspect of our efforts in environmental auditing is that our Department encourages local governments as well as industry to use the technique. Local governments frequently have extensive environmental responsibilities. In certain respects, their compliance record has not been as good as industry's record. We believe that the same features that make environmental auditing an effective management tool for industry will make it an effective management tool for local governments.

Our agency feels that more widespread use of environmental auditing in North Carolina will yield other important benefits. First, we believe that it will improve communication between regulatory agencies like ours and the people who use auditing programs. That's because users know what their compliance status is. They find out about problems early, can correct them early, and when required, can let government agencies know about the problem. Indeed, although environmental auditing is an internal management tool, some companies have chosen to incorporate regulator contacts with regulatory agencies as a part of their programs.

The second benefit is that environmental auditing lays the groundwork for our "Pollution Prevention Pays" program. I think you all are familiar with this concept. Through pollution prevention and waste reduction we hope to eliminate the causes of pollution rather than spending large sums of money to clean up environmental problems after they occur. Our agency and other agencies in state government see pollution. prevention pays as an important part of the solution to many hazardous waste and other pollution problems. Environmental auditing gives a company or local government at least part of that baseline information that it will need to evaluate what low or non-pollution technology alternatives are available.

I've described what we see as the benefits of environmental auditing. Now let me give a quick summary of auditing activity in North Carolina. Use of various approaches to auditing appears broader than we thought originally, but still not extensive. Its use is especially limited among smaller industries and units of government. But, we see that the use of auditing is growing and that there is a lot of interest in it.

The programs that do exist in North Carolina seem to come from one of four points of origin. First, North Carolina has many large corporations that have headquarters elsewhere but one or more plants in the state. Some of these corporations have system-wide audit programs. The North Carolina facilities are audited as part of a larger program. Second, are manager-to-manager communications. The department hss initiated discussions with the top managers of various industries that have high potential for significant environmental impact. The message is that we should settle regulatory issues in manager to manager discussions whenever possible. Any settlements have to be done in a principled way, would have to result from discussions between managers, not lawyers, and need to aim for a result that protects the environment while recognizing the industries' interests as well. In some of those discussions, environmental auditing has emerged as a way to get those results.

A third point of origin is enforcement cases. In a number of cases, the people involved have asked for advice on how to avoid such problems in the future. In some of those cases, NRCD has suggested consideration of environmental auditing.

Finally, some North Carolina industries have learned about environmental auditing from sources other than NRCD and have seen the value in it. Duke Power Company is an example. Duke began its environmental auditing program approximately two years ago, and has been quite pleased with the results so far.

Environmental auditing is providing its value to users in and out of North Carolina. The feedback from the users is very positive. Therefore, NRCD plans to forge ahead to improve the effectiveness of our information and assistance program.

Through earlier financial support from EPA, we were able to study the feasibility and opportunity for a state supported program in environmental auditing. The institute for environmental studies at UNC-CH prepared an excellent report which we used to form our program.

It is the policy of the department to encourage the use of environmental auditing as a positive approach to environmental manangement and regulatory compliance. In developing and carrying out this policy, the Division of Environmental Management convened the North Carolina Environmental Auditing Roundtable. Members representing business, government and the community have provided invaluable advice and assistance in implementing a workable program for environmental auditing in North Carolina.

The Roundtable has helped prepare our environmental auditing information package, identified North Carolina groups with various auditing programs, and acts as an outreach to promote environmental auditing throughout the state.

We are optimistic about the potential of environmental auditing to help people help themselves meet their environmental responsibilities. We solicit your views and support for this effort. Thank you for inviting me to join you today.

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- Senior Environmental Planner, Puget Sound Council of Governments, Seattle, WA
- Policy and Program Analyst, U.S. Environmental Protection Agency, Washington, DC and Boston, MA:
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    - Regulatory Reform Staff, Office of Policy, Planning and Evaluation.
- Currently Environmental Auditing Project Manager, and Chief, Special Projects Unit, Regulatory Reform Staff, OPPE/EPA.

SUMMARY

Environmental Auditing: A Management Tool and Potential Regulatory Reform

Leonard Fleckenstein
Environmental Auditing Project Manager
U.S. Environmental Protection Agency

Definition

Environmental Auditing refers to internal management systems for reviewing facility operations and practices to assess and verify compliance with environmental regulations and corporate policies. As with other audits (e.g., operational or financial audits), environmental audits serve as a periodic check on on-going practices.

Why audit ?

Firms are motivated to establish audit systems for many reasons -- among them to help: verify compliance with environmental regulations; assess risks from hazards, whether regulated or unregulated; avoid tort liability; identify poor operating, maintenance or reporting practices, prevent surprises; realize financial savings; comply with Security and Exchange Commission requirements; and collect information helpful for merger, acquisition or expansion planning.

Role of Government

Rather than mandate third party oversight for all companies, EPA in 1981 began to consider existing in-house auditing programs as an alternative to the third party concept.

EPA began exploring a programmatic approach and envisioned a structured, voluntary program which would build on corporate auditing practices and be piloted in interested states. But as a result of uncertainties and concerns, it became clear that EPA had to re-examine its thinking.

During 1983 EPA explored less structured ways of getting at the same goals. The approach consisted of three interrelated activities: analysis, endorsement, and assistance.

Endorsement

Endorsement aimed to:
- express EPA approval of the concept of self-auditing,
- create a clearinghouse on state-of-the-art auditing practices to let firms, EPA and states learn from each other,
- acknowledge good programs by showcasing them, and
- encourage firms to adopt auditing or upgrade what they have.

Analysis

Our analytical efforts produced:
- a dozen pioneering reports providing the base for an EPA clearinghouse on current auditing practices,

- better understanding of how auditing works and its impact on environmental performance,
- evidence about auditing's benefits to the government, environment and industry,
- and suggestive directions for future policy development.

Assistance

As part of our "assistance" efforts we've offered limited assistance to states and firms interested in pursuing joint environmental auditing approaches which go beyond or otherwise differ from EPA's approach. Several states have expressed interest in building on or accelerating corporate auditing.

Federal agencies

Besides working with state and local agencies, we have been reaching out to other Federal agencies which own or operate polluting facilities to attempt to transfer private sector environmental auditing methods, as appropriate, to help those agencies meet environmental goals.

Future Directions

The next steps for our Environmental Auditing Project include:

- determining specific envvironmental benefits (quantified if possible), and
- identifying specific policy issues and options, as predicates to new policy initiatives, providing incentives for or removing existing disincentives to self-auditing.

Criteria

In evaluating corporate environmental auditing systems, state programs and EPA strategies, we may necessarily need to define some set of criteria for elements of effective audit systems. This criteria would likely have to be informal and broad, and might include at a minimum:

- strong commitment from the firm's senior management,
- an audit manager or team independent of production,
- a structured audit system with written audit procedures,
- technical quality of the audit activities,
- trained staff,
- audit frequency,
- a system for reporting audit findings to senior management,
- and a corrective action program.

Potential Policy Statement on Environmental Auditing

Based on the evaluations of corporate audit systems, state programs, and EPA compliance strategy options, we may develop a policy statement (or amend policies) to address auditing issues.

WORKSHOP E

ENVIRONMENTAL QUALITY OPERATIONS STUDIES AND APPLICATIONS

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EWQOS
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JOHN W. RUSHING

Native of Laurel, Mississippi

Jan 1962 -	Received BS Degree in Civil Engineering from Mississippi State University
Jun 1970 -	Master of Science Degree in Water Resources Management from University of Wisconsin
Feb 1962 - Sep 1972	Worked in various positions in Planning in Mobile District, Corps of Engineers. Major responsibilities included developing and analyzing water resources plans for various river basins in the district.
Sep 1972 - Jan 1981	Served as Chief, Environmental Resources Branch, of South Atlantic Division Office, Corps of Engineers, in Atlanta, GA. Responsible for review of environmental planning in five districts - Mobile, Jacksonville, Savannah, Charleston and Wilmington.
Jan 1981 - Present	Serving in dual capacity as Chief, Environmental Resources Branch, and Assistant Chief, Planning Division, of South Atlantic Division, Corps of Engineers.

WORKSHOP

ENVIRONMENTAL & WATER QUALITY OPERATIONAL STUDIES (EWQOS) AND APPLICATIONS

Presenters: Dr. Jerome L. Mahlock
Mr. Robert F. Gaugush
Mr. John T. Anderson

This workshop consisted of two presentations on the Corps of Engineers' research program entitled Environmental and Water Quality Operational Studies and one presentation on the application of the results of such research on a current Corps project.

Dr. Jerome Mahlock gave a slide presentation describing the overall EWQOS program. He noted that the EWQOS program was currently the largest funded Research and Development program within the Corps, attesting to the Corps' commitment to solve environmental quality problems associated with its water resource mission. A summary of his remarks is attached.

Mr. Robert Gaugush discussed the efforts that had been directed at developing a set of simplified techniques for predicting water quality and eutrophication potential. Using a series of slides, he reviewed the three major objectives of the efforts: (1) evaluate existing simplified techniques, (2) determine applicability to reservoirs and (3) modify existing or formulate new simplified techniques. A copy of his remarks is attached.

Mr. John Anderson discussed the application of some of the EWQOS work to the Richard B. Russell Dam and Lake project on the Savannah River in Georgia and South Carolina. The areas discussed included means to improve the dissolved oxygen content in the release waters from the Richard B. Russell project and to minimize the impacts of vegetation on water quality of the lake. Slides were utilized to show the development and design of an oxygen injection system at the project and demonstrate how it would work. A copy of Mr. Anderson's remarks is attached.

Attendance at the workshops varied from 15 to 30 people. The display prepared on the EWQOS program by WES attracted considerable attention and copies of information on the various studies in the program were provided to anybody desiring them.

JEROME L. MAHLOCH

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FUNCTIONAL TITLE: Program Manager, Environmental and Water Quality Operational Studies, Environmental Laboratory

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MS, Civil Engineering, University of Nebraska, 1968
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EXPERIENCE:

1970-1974, Mississippi State University, Assistant Professor of Civil Engineering and Microbiology
1974-1977, Special Assistant, Environmental Engineering Division, Environmental Effects Laboratory
1977-Present, Program Manager, Environmental and Water Quality Operational Studies, Environmental Laboratory

PROFESSIONAL INTERESTS:

Environmental Engineering, Hazardous Waste Disposal, Microbiology, Environmental Data Analyses specializing in Multivariant Techniques, Computer Programming, Environmental Effects associated with Water Resource Development

ORGANIZATIONAL MEMBERSHIP:

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OTHER EXPERTISE/ACCOMPLISHMENTS:

Registered Professional Engineer, State of Mississipppi

Environmental and Water Quality Operational Studies

(EWQOS) - An Overview

by Jerome L. Mahlock, Program Manager
USAE Waterways Experiment Station
Vicksburg, MS

I wish to thank the organizers of this Eighth Environmental Review Conference for allowing me to discuss the EWQOS program and report on its findings. My talk will be an overview of the program and succeeding presenters will highlight specific applications at the R. B. Russell project.

The EWQOS program is solving environmental problems affecting reservoir and inland waterway projects of the Corps. Impetus for the program began with the passage of NEPA and problems Corps field offices faced in meeting newly emerging National environmental goals. Input from field offices was critical in formulating the EWQOS program and has continued throughout its execution. Currently, EWQOS is the largest funded R & D program within the Corps, attesting to its commitment to solve environmental quality problems associated with its water resource mission.

Within the EWQOS program there has been a major emphasis on field studies of operational projects. These studies have provided the data to understand the environmental response of our projects and contribute to the development of technology. Field studies also offer an avenue to demonstrate technology and to verify methods such as numerical water quality models. Information provided by field studies also contributes to improving Corps environmental monitoring programs and the usefulness of data gained from these programs.

Major findings from studies on reservoir projects are their environmental response based on design or operation which lead to improved evaluation tools and management or remedial actions to correct environmental problems. Evaluation techniques developed include numerical water quality models plus nutrient loading analysis models to evaluate water quality conditions. The numerical models include both 1- and 2-dimensional representations of reservoirs that are completely capable of simulating projects over a wide range of conditions. Nutrient loading analysis provides a quick and efficient network of models for evaluation response to eutrophy and can have wide ranging inferences to monitoring programs.

There are several major operational problems associated with reservoirs that are covered within the EWQOS program. Nuisance algae blooms are a consequence of eutrophication in reservoirs. Control of nutrients along with mixing in controlled enclosures has demonstrated that these nuisance algae can be suppressed. Fisheries both within a reservoir and in the tailwater are interrelated and very responsive to project management or operation. Studies of reservoir fisheries have lead to procedures to evaluate their impacts and management procedures to alleviate these impacts for a variety of operational scenarios and project categories. Erosion control on reservoir shorelines is a prevalent problem that has aesthetic, habitat, and water quality implications. Vegetation can be used in many cases to control shoreline erosion. These techniques have been demonstrated at several projects in various locations around the country. Interactions between reservoir sediments and the water column has obvious water quality implications. Laboratory and field studies on these processes have contributed to improved water quality modeling techniques and evaluation of reservoir clearing and filling practices.

EWQOS results have also been applied to the design of reservoir projects. Of particular importance is the design of selective withdrawal systems to control project water quality. Additionally, emphasis has been placed on reaeration of hydropower releases where dissolved oxygen may be a problem. Design and operation guidance are also available for reservoir mixing and aeration to improve water quality.

Studies related to inland waterway projects have focused on impacts attributable to project features. Emphasis has been placed on field studies and a habitat approach to evaluating ecological conditions. Such diverse project features as revetments, dikes, and cutoff bendways have been studied. Results have demonstrated that many project features add to the ecological diversity of waterways and may, in some cases, offer significant opportunities for improved management of natural resources.

Results from waterway field studies have been verified at several sites throughout the country. Information has contributed markedly to methods for monitoring large waterway projects. In particular, the use of hydroacoustics appears very promising for dynamically studying fishery resources. Studies are also currently underway that address the biological impacts of navigation traffic and fleeting areas.

For several project categories information has been assembled that provides environmental features for design, construction, operation, and maintenance. These project categories include dikes, levees, streambank protection, and flood control channels. This information has been assembled in a series of comprehensive documents for each project category.

As the EWQOS program is completed during the current fiscal year, emphasis has been placed on technology transfer activities. These include publication of results in various media, informing potential users of available information, and providing assistance to Corps elements in the application of EWQOS technology. A commitment to technology transfer will ensure that the products of EWQOS are effectively used to solve environmental quality problems facing the Corps and promote sound water resource development in harmony with National Environmental goals.

Robert F. Gaugush

EDUCATION

A. Undergraduate Education

- B.A. (Biology) 1975
  Lewis University, Lockport, Illinois.

B. Graduate Education

- Masters Degree - bypassed
- Ph. D. (Ecology) 1985
  Kent State University, Kent, Ohio.
- Dissertation - Signal Analysis: A Method for the Characterization of Ecosystem Behavior

EXPERIENCE

A. September 1975 - September 1978. Teaching Fellowship.

B. October 1978 - July 1979. Research Fellowship.
Research position in the Department of Hydrobiology at the University of Warsaw, Poland. Research with Dr. Z. M. Gliwicz involved modeling the size-specific and age-specific population dynamics of freshwater zooplankton.

C. September 1979 - May 1982. Teaching Fellowship.

D. June 1982 - Present. Instructor.
Although employed by Kent State University as an instructor, I presently perform the duties of a Biologist as outlined in an Interagency Personnel Agreement between the University and the U.S. Army Engineer Waterways Experiment Station.

SIMPLIFIED TECHNIQUES FOR PREDICTING
EUTROPHICATION IN IMPOUNDMENTS

by

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Environmental Laboratory
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One of the major research efforts within the Environmental and Water Quality Operational Studies (EWQOS) was directed at developing a set of simplified techniques for predicting reservoir water quality and eutrophication potential. This research effort had three major objectives: 1) evaluate existing simplified techniques, 2) determine applicability to reservoirs, and 3) modify existing or formulate new simplified techniques. This research has been conducted by W.W. Walker, Jr. under a contract with the U.S. Army Corps of Engineers Waterways Experiment Station and has produced three reports (Walker, 1981; 1982; 1984) that describe the data base development, model testing, and model refinements. A users manual for the application of these simplified techniques is currently being prepared.

Simplified techniques or empirical models differ considerably from the more typical simulation models used for the prediction of water quality. Mathematical simulation models require large data sets and considerable user expertise to provide their high resolution (in space and time) predictions of water quality. Empirical models, on the other hand, require less data and user expertise but provide lower resolution (spatially and temporally averaged) predictions. Numerous empirical models for predicting lake water quality have been developed and can be grouped into two major types. Nutrient balance models attempt to relate lake or outflow nutrient concentrations to nutrient loading, morphometry, and hydrology. Eutrophication response models attempt to describe the relationships between eutrophication indicators (eg. nutrient concentration, chlorophyll a, transparency, and oxygen depletion) within the lake. These models have been successful in predicting the average water quality conditions in a number of north temperate lakes.

While lakes and reservoirs certainly share the same biological and chemical processes there are several significant differences between lakes and reservoirs that may influence the ability to apply the existing empirical models to reservoirs. A comparison of 309 natural lakes and 108 U.S. Army Corps of Engineers (USAE) reservoirs included in the 1972-75 U.S. Environmental Protection Agency National Eutrophication Survey indicated that reservoirs had greater drainage and surface areas, drainage/suraface area ratios, mean and maximum depths, shoreline development ratios, and areal water loads than did natural lakes. Reservoirs also had shorter hydraulic residence times and lower total phosphorus and chlorophyll concentrations despite higher total phosphorus and nitrogen loadings (Thornton et al., 1982). Reservoirs also exhibit pronounced longitudinal gradients in water quality as a result of the advective and unidirectional transport that dominates these systems (Baxter, 1977).

Given these differences between natural lakes and reservoirs it was not unexpected that existing empirical models did not adequately predict water quality when applied to reservoirs. Walker (1982) examined these existing techniques using data from 108 USAE reservoirs and concluded that reservoir-specific factors such as turbidity, water residence time, mean depth, morphometric complexity, and the existence of spatial gradients in water quality necessitated an extensive modification of the existing simplified techniques. Walker (1984) developed three empirical models (FLUX, PROFILE, and BATHTUB) that represent a significant improvement over existing simplified techniques. These empirical techniques relate eutrophication symptoms to nutrient loading, hydrology, and reservoir morphometry through the use of statistical models derived from a representative cross-section of reservoirs.

FLUX was developed as an interactive program for estimating mass loadings or discharges passing a tributary or outflow monitoring station. The purpose of the program is to estimate average or total nutrient loading based on intermittent grab-sample concentration data a complete flow record. Loading estimates derived from the application of the model can be used in eutrophication response models. FLUX also provides for an assessment of the data and the sampling program used to collect it.

PROFILE facilitates the analysis and interpretation of pool water quality data from existing reservoirs. A number of graphic displays are included to assist the user in developing an understanding of the spatial and temporal variability in water quality within a given reservoir. Also included in the model are algorithms for the calculation of hypolimnetic oxygen depletion rates and for the estimation of area-weighted, suface-layer mean concentrations of nutrients and other response variables.

BATHTUB was designed to permit the application of empirical eutrophication response models to morphometrically complex reservoirs or to collections of reservoirs. The program performs water and nutrient balance calculations in a spatially segemented hydraulic network which accounts for advective and diffusive transport and nutrient sedimentation. Eutrophication-related water quality conditions (ie. total phoshorus, total nitrogen, chlorophyll a, transparency, and hypolimnetic oxygen deficit rate) are predicted using empirical relationships previously developed and tested (Walker, 1984). The application of BATHTUB would normally follow the use of FLUX to reduce tributary or inflow data and the use of PROFILE to reduce reservoir pool water quality data.

The empirical models described above can be used in two general applications: diagnostic and predictive. In the diagnostic mode, the models provide a framework for data reduction and analysis of water quality data from a given reservoir. The analysis allows for an interpretation of eutrophication-related water quality conditions and their controlling factors. Reservoir water quality can be compared to water quality standards and objectives or to the water quality of other reservoirs. In the predictive mode, the models can be used to project future water quality conditions in the reservoir. The models can be used to predict the long-term responses to changes in the controlling variables. Projected water quality changes in response to changes in inflow nutrient concentration, mean pool level, or hydrology culd be determined.

Eutrophication has a number of significant effects on reservoir water quality and can seriously impair reservoir use. Eutrophication-related symptoms such as algal blooms, hypolimentic anoxia, and high levels of reduced metals have direct effects on the potential uses of the water in and downstream of the reservoir. Recreation, water supply, and wildlife can all be significantly impacted by eutrophication. Methods for predicting eutrophication and the related water quality conditions are required to aid in the design and operation of reservoirs in ways which are consistent with operational and water quality objectives. The simplified techniques described above represent a means to understand current water quality conditions as well as a means to project future changes in reservoir water quality.

BIBLIOGRAPHY

Baxter, R.M. 1977. Environmental Effects of Dams and Impoundments. Ann. Rev. Ecol. Syst. 8:255-283.

Thornton, K.W., R.H. Kennedy, A.D. Magoun, and G.E. Saul. 1982. Reservoir Water Quality Sampling Design. Wat. Res. Bull. 18:471-480.

Walker, W.W., Jr. 1981. Empirical Methods for Predicitng Eutrophication in Impoundments; Phase I: Data Base Development. Technical Report E-81-9, U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS.

Walker, W.W., Jr. 1982. Empirical Methods for Predicting Eutrophication in Impoundments; Phase II: Model Testing. Technical Report E-81-9, U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS.

Walker, W.W., Jr. 1984. Empirical Methods for Predicting Eutrophication in Impoundments; Phase III: Model Refinements. Technical Report E-81-9, U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS.

JOHN T. ANDERSON

John Anderson, a native North Carolinian, received both the BS (1972) and MAT (1972) degrees in science teaching from the University of North Carolina in Chapel Hill. After teaching in the public schools, he began his Federal service as a biologist with the U.S. Army Engineer District, Memphis, Tennessee. After more than five years, he accepted a position in 1978 as an ecologist with the U.S. Army Engineer District in Savannah, Georgia. His work with the Corps of Engineers has included a wide range of environmental studies, coordination, and documentation involving civil works, military construction, and regulatory functions. Since 1980, he has served as supervisor of one or another of the environmental sections within Savannah District's Environmental Resources Branch, Planning Division.

Beginning in February 1985, John Anderson will be working in the Future Directions Office of the Corps' headquarters, the Office of the Chief of Engineers in Washington, DC.

APPLICATIONS OF ENVIRONMENTAL WATER QUALITY OPERATIONAL STUDIES

by JOHN T. ANDERSON

The Savannah District is one of 36 districts in the U.S. Army Corps of Engineers. At the district level civil works projects are planned, designed and constructed. During this process, managers are often faced with environmental questions that need some scientific basis for decision making. One of the ways of obtaining the necessary information is to turn to the major research arm of the Corps, the U.S. Army Engineer Waterways Experiment Station, located in Vicksburg, Mississippi. One particular program at Waterways is a series of studies called the Environmental Water Quality Operational Studies (EWQOS). This report outlines the applications of these EWQOS studies to the Richard B. Russell Dam and Lake project on the Savannah River in Georgia and South Carolina.

There are three lakes in succession on the Savannah River. The northernmost is Hartwell Dam and Lake completed in 1959 and covering approximately 55,000 surface acres. The southernmost is the Clarks Hill Dam and Lake, completed in 1956 and covering approximately 71,000 surface acres. The Richard B. Russell Lake was impounded this year and will cover 26,000 acres. A powerhouse is still under construction at the Richard B. Russell Dam where power-on-line is scheduled for December 1984. Taken together, these three lakes form a series with essentially no free flowing water between them. Hartwell Lake empties into Richard B. Russell Lake, which empties into Clarks Hill Lake. This is a unique situation in the Southeast and offers a special opportunity for scientific study. Recognizing that placing Richard B. Russell Lake between Hartwell and Clarks Hill Lakes could impact water quality and fisheries, the Savannah District began looking for answers to some obvious questions related to water quality and fishery.

These lakes do stratify in the summer, beginning in about June and breaking up in November. The potential impacts of releasing cold, low dissolved oxygen hypolimnetic waters from Hartwell and running them through Richard B. Russell and through Clarks Hill Lakes was a major concern. Prior to impoundment of Richard B. Russell the free flowing river between Hartwell and Clarks Hill Lake provided some reaeration of the waters being released by Hartwell. The impoundment of the free flowing river is now a lake environment. One would expect impacts on water quality, as well as the fishery. The District's primary concerns were the impacts on dissolved oxygen and temperature in Richard B. Russell Lake and Clarks Hill Lake. There is a put-and-take trout fishery in the cold water releases below Hartwell Lake and a healthy fishery in Clarks Hill Lake which could be secondarily impacted by the creation of Richard B. Russell Lake.

In the mid-70's a technical committee was established to study the thermal and dissolved oxygen characteristics of the proposed Richard B. Russell Lake to identify potential water quality problems. The objectives of this study were to design a project that could meet the following criteria:

1. Maintain Federal and State water quality standards.

2. Maintain a cold water fishery in a 10-mile reach downstream of Hartwell.

3. Develop a warm and cold water fishery within Richard B. Russell Lake.

4. Maintain a warm and cold water fishery within Clarks Hill Lake.

Because of the rather complex nature of this aquatic system, three lakes in series, the Savannah District called upon the expertise of the Waterways Experment Station to apply physical and mathematical models to address these concerns. They used these models to study lake conditions under conventional power generation, pumped storage operations, and also with supplementing releases with dissolved oxygen. The initial findings of this study were that (1) water quality standards could be met in releases from Russell if dissolved oxygen were injected during periods of thermal stratification, (2) cold water fishery downstream of Hartwell Dam could be maintained if oxygen was injected as need, (3) the warm and cold water fishery at Richard B. Russell could be achieved with a dissolved oxygen injection system, and (4) the warm and cold water fishery at Clarks Hill Lake could be maintained for a distance of about 25 miles downstream with oxygen injection at Russell.

The Savannah District conducted some additional baseline studies to determine the exact water quality conditions at Hartwell and at Clarks Hill Lakes prior to the establishment of Richard B. Russell Lake. These studies were conducted in 1981 and generally concluded that water quality was good and that most parameters were within acceptable State and Federal limits. The sediment analysis revealed no elevated levels of heavy metals, pesticides or PCBs.

The largest study that the District and Waterways became involved in was to investigate ways to raise the dissolved oxygen level in the Russell Dam releases. The District had committed itself to maintaining six parts per million dissolved oxygen in the releases from Russell. Waterways Experiment Station explored several methods of achieving this objective. Several tests were run at the Clarks Hill Lake to assist in this effort. Some of the methods looked at were:

1. Surface aeraters.

2. Diffused air injection.

3. Spillway aeration.

4. Penstock air injection.

5. Multilevel penstock intakes.

6. Submerged weirs.

7. Oxygen injection/penstocks.

8. Midstream oxygenation.

9. Pure oxygen injection through fine pore diffusers at the face of the dam.

10. Continuous oxygen injection through pore diffusers above the dam.

The lab and field tests that were conducted led to the conclusion that a pulse and a continuous oxygen injection system were the best means of achieving the six parts per million dissolved oxygen in the releases. This system would also allow for cold water releases from Richard B. Russell which were desirable for fishery purposes in Clarks Hill Lake. This system could also be built at the same time as the dam construction.

The pulse system is located at the dam while the continuous injection system is located approximately 1 mile upstream. The studies by Waterways Experiment Station concerning the expected flows of waters in the reservoir assisted in the location of this continuous oxygen injection system. The pulse system consists of eight 340 foot lengths of fiberglass pipe with 216 diffusers. The pipes are placed between the 8 hydropower intakes and extend perpendicular to the dam just above the bottom. They would be fed by a storage tank on shore, a pipe running across the top of the dam, and pipes descending the face of the dam between the intakes. This pulse system would be operated only in severe conditions during stratification when the continuous system was unable to achieve the six parts per million of the dissolve oxygen in the release waters. The continuous oxygen injection system located 1 mile upstream consists of two 1,200-foot links of 8-inch fiberglass pipe, each pipe containing 1,080 diffusers, extending across the lake. These pipes are suspended approximately 10 feet from the bottom. Efforts were made to construct these oxygen injection systems in the dry, however, schedules did not allow that and the construction is being completed now.

Another study that was conducted by the Waterways Experiment Station under the EWQOS Program addressed the potential impacts on water quality of inundating 26,000 acres of hardwood forest. As this area is flooded there are large amounts of organic material, not only in the trees themselves, but the leaf litter and the soil, which demand large amounts of the oxygen as they decay. In order to alleviate some of this expected problem the District began a program of clearing some of the vegetation. The District removed vegetation on 9,500 acres within the area to be inundated in order to remove some of this oxygen demanding material. Some of these trees were left behind at carefully selected locations to serve as fish attracters for the recreation program at the lake. Not all the vegetation was removed but large areas were completely scrapped of oxygen demanding material.

With the potential problems identified, and with a system in place to alleviate these potential problems, the District set about establishing a monitoring program that would allow it to show compliance with the objectives. This monitoring program is somewhat unique. The Corps of Engineers does not, in most cases, go back to projects after they are constructed to see if predictions have come true and if the problems have indeed been solved as was projected. In this case, however, the Savannah District established with its own funds and also with EWQOS funds from Waterways Experiment Station a Joint Comprehensive Water Quality Monitoring Program. The objectives of this program were to (1) determine conditions during impoundment, (2) to determine the impacts of Richard B. Russell Lake on Clarks Hill, and (3) to monitor the performance of the oxygen injection system.

Waterways Experiment Station established a laboratory on Richard B. Russell Lake, equipped it and staffed it with personnel to run a full series of water quality tests. This laboratory was established in August of 1983 and has been taking samples at the lake since October 1983, prior to the beginning of impoundment. The present agreement is for a 3-year effort by the laboratory to look at water quality at 20 main stations and several supplemental stations in Hartwell Lake, Richard B. Russell Lake, and Clarks Hill Lake such that impacts can be traced throughout the three lake system. There are numerous parameters that are being examined through field and laboratory measurements, these include physical characteristics, metals, nutrients, and biological factors. The investigation team is looking at depth profiles, as well as lake transects. Many of the stations are located in the vicinity of the oxygen injection system so that the monitoring results can be used to fine-tune the oxygen injection system. Other Environmental Water Quality Operational Studies that are going on at the laboratory include the investigations into the decomposition rates of organic material in Richard B. Russell Lake, sediment deposition, and zooplankton and macroinvertebrate populations.

Another study that is underway addresses the application of turbine venting at dams. Waterways Experiment Station is presently doing a test at Clarks Hill Lake to develop a generalized model of how turbine venting can be designed into dams. Savannah District will apply this model at its dams to determine the feasibility of using this practice at Hartwell Lake and Clarks Hill Lake. Turbine venting consists of installing baffle plates on the main turbine units. It is expected that such plates can add an additional two to four parts per million dissolved oxygen in the releases. If it is found to be feasible at Hartwell and Clarks Hill Dams, Savannah District will attempt to employ this method of raising dissolved oxygen levels in those released waters.

The EWQOS program has assisted the District in drawing the following conclusions about the Richard B. Russell project:

1. State water quality standards will be met.

2. The oxygen injection at Russell and turbine venting at Hartwell will insure the maintenance of good water quality conditions in Russell and Clarks Hill Lakes.

3. A substantial warm water fishery will exist in Russell Lake.

4. The conditions will also be maintained in Clarks Hill Lake and established in the upper end of Russell Lake for a cold water fishery.

All of these studies are helpful to the District in determining what impacts are going to occur in the three lake system and make it possible for us to adjust our operational plans to alleviate any adverse impacts.

APPENDIX A

309 AREAS OF RESPONSIBILITY

Sheppard N. Moore, Section Chief

- Nuclear Regulatory Commission

Clara DeLay

- Department of Housing & Urban Development
- General Services Administration
- Economic Development Administration
- National Park Service
- Forest Service
- Farmer's Home Administration
- U.S. Poastal Service
- Veterans Administration
- Urban Mass Transportation Administration
- Interstate Commerce Commission
- Federal Aviation Administration
- Federal Housing Administration
- Farm Credit Administration

Gerald Miller

- Joint Chiefs of Staff
- U.S. Air Force, Army, Navy, Coast Guard
- Department of Defense
- Soil Conservation Service
- Corps of Engineers (non-energy, non-transportation)
- National Oceanic & Atmospheric Administration
- Fish & Wildlife Service

Christian M. Hoberg

- Department of Transportation
- Department of Energy
- Bureau of Land Management
- Bonneville Power Administration
- Federal Energy Regulatory Commission
- Rural Electric Administration
- Tennessee Valley Authority
- Minerals Management Service
- Bureau of Mines
- Mining Enforcement and Safety Administration
- Office of Surface Mining
- Bureau of Reclamation
- Federal Highway Administration
- Federal Railroad Administration
- Hazardous Materials Transportation
- National Highway Traffic Safety Administration
- National Transportation Safety Board
- U.S. Railway Association

OTHER PROGRAM AREAS OF RESPONSIBILITY

Reginald Rogers, Coordinator

- Ocean Dumping
- Coastal Zone Management
- Outer Continental Shelf

404 AREAS OF RESPONSIBILITY

Bill Kruczynski, Section Chief

Phosphate Mining

Beverly Ethridge

Mobile, Alabama District

Barbara Kleiss

Jacksonville, Florida District
(North Florida)

Allen Lucas

Huntington, West Virginia District
Louisville, Kentucky District
Nashville, Tennessee District
Savannah, Georgia District

Tom Welborn

Memphis, Tennessee District
Vicksburg, Mississippi District

Eric Hughes

Jacksonville, Florida District

Lee Pelej

Wilmington, North Carolina District

Howard Marshall

Charleston, South Carolina District

APPENDIX B

POLICY AND PROCEDURES For The REVIEW OF FEDERAL ACTIONS IMPACTING THE ENVIRONMENT

U.S. Environmental Protection Agency
Office of External Affairs
Office of Federal Activities
Washington, D.C. 20460

I-b

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CHAPTER 1 - PURPOSE, POLICY, AND MANDATES

1. PURPOSE.

a. This Manual establishes policies and procedures for carrying out the Environmental Protection Agency's (EPA's) responsibilities to review and comment on Federal actions affecting the quality of the environment. EPA has general statutory authority under the National Environmental Policy Act of 1969 and the Council on Environmental Quality's implementing regulations, and has specific authority and responsibility under Section 309 of the Clean Air Act to conduct such reviews, comment in writing, and make those comments available to the public. These responsibilities have been combined into one process and are referred to throughout this Manual as the "Environmental Review Process."

b. This Manual contains EPA's policies and procedures for carrying out the Environmental Review Process, assigns specific responsibilities, and outlines mechanisms for resolving problems that arise in the Environmental Review Process. This Manual is supplemented by, and should be read in conjunction with, the following manuals, which are also prepared, distributed, and maintained by the Office of Federal Activities:

(1) Office of Federal Activities Policies and Procedures Manual. Contains current guidance and detailed information related to the Environmental Review Process; and

(2) Environmental Review Process Data Management Manual. Contains detailed guidance and reporting requirements for the national level computerized tracking system.

2. STATUTORY AUTHORITIES.

a. The National Environmental Policy Act of 1969 (NEPA), as amended, (42 U.S.C. 4321 et seq., Public Law 91-190, 83 Stat. 852), requires that all Federal agencies proposing legislation and other major actions significantly affecting the quality of the human environment consult with other agencies having jurisdiction by law or special expertise over such environmental considerations, and thereafter prepare a detailed statement of these environmental effects. The Council on Environmental Quality (CEQ) has published regulations and associated guidance to implement NEPA (40 CFR Parts 1500-1508).

b. Section 309 of the Clean Air Act, as amended, (42 U.S.C. 7609, Public Law 91-604 12(a), 84 Stat. 1709), requires the EPA to review and comment in writing on the environmental impact of any matter relating to the duties and responsibilities granted pursuant to the Act or other provisions of the authority of the Administrator, contained in any: (1) legislation proposed by a Federal department or agency; (2) newly authorized Federal projects for construction and any major Federal action, or actions, other than a project for construction, to which Section 102(2)(C) of Public Law 91-190 applies; and (3) proposed regulations published by any department or agency of the Federal Government. Such written comments must be made public at the conclusion of any review. In the event such legislation, action, or regulation is determined to be unsatisfactory from the standpoint of public health, welfare, or environmental quality, the determination will be published and the matter referred to the CEQ.

c. Federal environmental laws require, in most circumstances, facilities of the Executive Branch of the Federal Government to comply with Federal, State, and local pollution control requirements promulgated pursuant to, or effective under, those statutes. The review of proposed Federal projects for compliance with these national environmental standards is the responsibility of the EPA through the Environmental Review Process and the Federal Facilities Compliance Program. In addition to these general statutory authorities, the reviews required under Section 1424(e) of the Safe Drinking Water Act (42 U.S.C. 300 h-3, Public Law 93-523, 88 Stat. 1678) and Section 404(r) of the Federal Water Pollution Control Act (Clean Water Act) (33 U.S.C. 1344(r), Public Law 92-500, Public Law 95-217, 86 Stat. 884, 91 Stat 1600) are integrated into the Environmental Review Process.

3. POLICY.

a. The objective of the Environmental Review Process is to foster the goals of the NEPA process by ensuring that the EPA's environmental expertise, as expressed in its comments on Federal actions and other interagency liaison activity, is considered by agency decisionmakers. It is EPA's policy to carry out the Environmental Review Process in conjunction with EPA's other authorities to:

(1) Participate in interagency coordination early in the planning process to identify significant environmental issues that should be addressed in completed documents;

(2) Conduct follow-up coordination on actions where EPA has identified significant environmental impacts to ensure a full understanding of the issues and to ensure implementation of appropriate corrective actions; and

(3) Identify environmentally unsatisfactory proposals and consult with other agencies, including the CEQ, to achieve timely resolution of the major issues and problems.

b. In implementing this policy, EPA will assist Federal agencies in:

(1) Achieving the goals set forth in the NEPA;

(2) Meeting the objectives and complying with the requirements of the laws and regulations administered by the EPA; and

(3) Developing concise, well-reasoned decision documents which identify project impacts, a range of project alternatives, and mitigation measures that will avoid or minimize adverse effects on the environment.

CHAPTER 2 - MANAGEMENT OF THE ENVIRONMENTAL REVIEW PROCESS

1. GENERAL RESPONSIBILITIES. The EPA Administrator has delegated responsibility for carrying out the Environmental Review Process to the Assistant Administrator for External Affairs and the Regional Administrators but has retained the responsibility to refer matters to the CEQ. The Assistant Administrator, Office of External Affairs, has in turn delegated program management to the Director, Office of Federal Activities, but has retained the responsibility for concurring on proposed comment letters that have the potential for referral to the CEQ.

2. OFFICE OF FEDERAL ACTIVITIES. The Office of Federal Activities (OFA) within the Office of External Affairs (OEA) is the program manager for the Environmental Review Process and for the overall coordination and policy development for activities associated with this process. To carry out these responsibilities, the OFA will maintain management support functions consisting of Federal Agency Liaison staff assigned to coordinate with the Headquarters offices of all Federal agencies and a Management Information Unit. The Director, Federal Agency Liaison Division, working through the Director, OFA, has overall policy development and management oversight responsibility for the Environmental Review Process.

a. Federal Agency Liaisons. Each Federal Agency Liaison (FAL), working through their Division Director and other appropriate elements within the OFA, has the following responsibilities:

(1) Conduct Headquarters-level liaison with other Federal agencies to identify those actions that should be reviewed and to provide information on how the EPA can most effectively review other agencies' proposed actions pursuant to the Environmental Review Process;

(2) Provide management oversight of regional review actions carried out under the requirements of this Manual, and provide policy guidance on the Environmental Review Process to Headquarters program offices and regional EIS reviewers;

(3) Ensure appropriate Headquarters involvement and support for actions that are elevated under these procedures; and

(4) Coordinate the EPA review of proposed regulations, national level Environmental Impact Statements (EIS's), and other national level activities and other national level actions.

b. Management Information Unit.

(1) The Management Information Unit (MIU) is responsible for the operation of a centralized data management and reporting system for the Environmental Review Process, and for the public availability of comments pursuant to Section 309 of the Clean Air Act. The procedures and requirements for this centralized data system are described in the Environmental Review

Process Data Management Manual. The MIU is also responsible for the official filing of all EIS's in accordance with 40 CFR Section 1506.9.

(2) The MIU is responsible for preparing the following reports to inform EPA officials and the public of EIS's and other Federal actions received by the EPA for review and comment.

(a) COMDATE. This weekly computerized report contains a list of all EIS's filed, pursuant to 40 CFR Section 1506.9, during the previous week. COMDATE lists, in part, the EIS title, official filing date, EPA control numbers, location, Federal Register notice date (40 CFR 1506.10(a)), date comments are due to the lead agency, and regional assignment. Other relevant information is also noted such as overall extensions of time granted by lead agencies and EPA ratings of previously filed draft EIS's.

(b) CEQ Notice of EIS Availability. A Notice of Availability is published in the Federal Register each Friday for EIS's filed during the previous week, pursuant to 40 CFR Section 1506.10(a). The minimum periods for review of the EIS's are calculated from the Federal Register date of this notice.

(c) Notice of Availability of EPA Comments. A notice will be published weekly announcing the availability of EPA comments on EISs, regulations, and any other action for which an unsatisfactory determination has been made. The notice will include, in part, the title, a summary of comments, and the rating (if applicable) of each review completed.

3. REGIONAL OFFICE. Each EPA regional office is responsible for carrying out the Environmental Review Process in accordance with the policies and procedures of this Manual for proposed Federal actions affecting its region. Each EPA regional office will designate a regional environmental review coordinator who has overall management responsibility for the Environmental Review Process in that region. It is the responsibility of the regional environmental review coordinator to:

a. Ensure that the region is maintaining effective liaison with other Federal agencies at the regional level;

b. Carry out lead responsibilities for the review of proposed EIS's and other Federal actions assigned to the coordinator's region or other actions for which it has lead responsibility (see paragraph 6 of this chapter); and

c. Ensure that the region is maintaining the official agency files and is properly tracking correspondence generated under the regional Environmental Review Process.

4. PROGRAM OFFICES. EPA program offices are responsible for providing technical assistance and policy guidance on review actions directly related to their areas of responsibility. When acting as principal or associate reviewer

in accordance with paragraph 5 of this chapter, program offices will follow the policies and procedures set forth in this Manual.

5. SPECIFIC REVIEW MANAGEMENT RESPONSIBILITIES.

a. Headquarters and Regional Environmental Review Coordinators. The term Environmental Review Coordinator (ERC) is used in this Manual to mean either a regional environmental review coordinator or the OFA Division Director managing FAL responsibilities for a particular action agency. It is the ERC's responsibility to manage the environmental review of actions to ensure EPA compliance with the procedures in this Manual and to:

(1) Ensure the timely receipt of all assigned EIS's listed in COMDATE, and ensure completion of MIU reporting requirements;

(2) Designate a principal reviewer for each assigned action;

(3) Coordinate determination of the level of participation in EIS scoping efforts and manage participation efforts;

(4) Coordinate determination of EPA's involvement as a cooperating agency under Section 1501.6 of the CEQ regulations;

(5) Determine the case-by-case need for reviewing the adequacy of the contents of draft EIS's;

(6) Determine the case-by-case need for preparation of comments on final EIS's;

(7) Determine the appropriate rating to be assigned to each draft EIS in the comment letter;

(8) Determine the need for preparation of comments on non-EIS actions;

(9) Ensure timely distribution and public availability of comments; and

(10) Initiate and manage agency follow-up efforts on comment letters identifying significant problem areas.

b. Principal Reviewer. The principal reviewer (PR) is a person designated by the ERC to coordinate the review of the action and to prepare the EPA comment letter on the proposed Federal action. The PR will be responsible for ensuring that the views of other EPA offices are adequately represented in the comment letter, and that the comment letter is consistent with agency policy and reflects all applicable EPA environmental responsibilities. In general, the PR for Headquarters lead reviews will be the FAL assigned to the lead agency. The PR will have the responsibility to:

(1) Select associate reviewers (AR's) ensuring that all appropriate regional and Headquarters EPA offices are asked to participate;

(2) Set due dates for AR comments that will ensure adequate time for review by the signing official;

(3) Coordinate with AR's to ensure timely receipt of comments and timely resolution of disagreements or inconsistencies between reviewers;

(4) Review and assure the validity of all comments included in the final EPA response;

(5) Resolve and record the disposition of any disagreements with or between AR comments in accordance with subparagraph d, below;

(6) Ensure consistency of EPA comments with any previous comments on the action;

(7) Recommend the most appropriate rating of the environmental impacts of the proposal and/or the adequacy of the EIS, and include the rating in all draft EIS comment letters; and

(8) Ensure the distribution of copies of the signed comment letter to all AR's and other appropriate parties.

c. Associate Reviewer. The associate reviewer (AR) is a person designated by the PR to provide technical and policy advice in specific review areas and to provide the views of the office in which the AR is located. AR's will have the responsibility to:

(1) Review assigned actions within their areas of responsibility taking into account the policies and procedures of this Manual;

(2) Submit comments to the PR on actions in a timely manner;

(3) Obtain the appropriate level of concurrence on comments submitted;

(4) If significant issues are identified, assist the PR in determining the most appropriate rating for the proposed action; and

(5) Upon the request of the PR, and within the limits of available resources, provide liaison with, and technical assistance to, the agency that initiated the EIS or other Federal action.

d. Consolidation of Comments. The PR will consider all AR comments during preparation of the EPA comment letter. If the PR disagrees with substantive AR comments, the PR will attempt to resolve the differences directly with the

AR. If this is not possible, the ERC will be informed and will coordinate resolution of the issue. On comment letters where substantive changes are made to comments generated by an AR, the PR will obtain AR concurrence on the final letter. If major policy issues are involved, the ERC should be informed and policy level concurrence by the AR office should be obtained. All AR comments, with applicable PR notations on disposition of the specific issue, will be retained in the official project file.

6. ROUTING AND LEAD RESPONSIBILITY OF EIS'S AND OTHER FEDERAL ACTIONS.

a. Distribution of EIS's should be accomplished by lead agencies on or before the EIS filing date. To ensure that all EIS's are properly distributed, the ERC will check the weekly COMDATE report to make sure that all assigned EIS's have been received. If the ERC has not received an EIS identified in COMDATE, the ERC will inform the MIU immediately and work with the MIU to obtain the EIS. If appropriate, a request for a time extension due to lack of availability of the EIS will be coordinated by the MIU at that time. The following table represents the normal routing and lead responsibility assignment of review actions.

Action	Directed to
Legislation (not accompanied by EIS)	Office of Legislative Analysis
Policy statements, regulations, procedures, and legislation accompanied by an EIS	Office of Federal Activities
Actions that embody a high degree of national controversy or significance, or pioneer Agency policy	Office of Federal Activities
All other actions	Appropriate regional office

b. In general, a regional office will have the lead responsibility for reviewing all EIS's and other Federal actions it receives. Specific exceptions occur where:

(1) The EIS or other Federal action pertains to an action that is to take place in another region. In such cases, that regional office will have the lead, the MIU will be informed immediately, and the EIS will be forwarded to the lead region.

(2) The EIS pertains to more than one region. In this case, the affected regions should refer to COMDATE to determine which is the lead region and which is an AR. If there is a disagreement with the COMDATE assignments, the designated lead region will inform the MIU.

(3) The EIS or other Federal action pertains primarily to national EPA policy, regulations, or procedures, or to an action which does not have a

geographical focus (e.g., overlapping several regions), or to an action concerning areas in which the regional office does not have adequate expertise. If the ERC suspects this to be the case, the ERC will contact the appropriate FAL to determine lead responsibility. Unless otherwise agreed upon, such cases will be forwarded immediately to the MIU for reassignment of the action.

c. A regional or Headquarters office may at any time request that a particular EIS or other Federal action be evaluated by the OFA to determine lead responsibility.

CHAPTER 3 - PRE-EIS REVIEW ACTIVITIES

1. POLICY. It is EPA's policy to participate early in the NEPA compliance efforts of other Federal agencies to the fullest extent practicable in order to identify EPA matters of concern with proposed agency actions and to assist in resolving these concerns at the earliest possible stage of project development. The ERC will make a concerted effort to resolve project concerns through early coordination, where possible, rather than rely on submission of critical comments on completed documents.

2. GENERAL LIAISON.

a. The regional environmental review coordinator and the FAL's will establish and maintain contact at the appropriate levels of other agencies in order to foster an effective working relationship between agencies, to understand the agencies' programs and policies, and to be kept informed of projects of interest to the EPA.

b. To the fullest extent practicable, the ERC will assist the action agencies in:

(1) Early identification of potential project impacts and the need to prepare assessments or EIS's;

(2) Identification of appropriate environmental assessment techniques and methodologies; and

(3) Incorporation of all reasonable alternatives and impact mitigation measures in the planning and development of projects.

3. EPA'S PARTICIPATION IN SCOPING.

a. General. Scoping is the formal early coordination process required by CEQ's 1979 Regulations (40 CFR 1501.7) and is intended to ensure that problems are identified early and are properly studied, that issues of little significance do not consume time and effort, that the draft EIS is thorough and balanced, and that delays occasioned by an inadequate draft EIS are avoided. To help achieve these objectives, EPA will participate in scoping processes to the fullest extent practicable, emphasizing attendance at scoping meetings.

b. Responding to Scoping Requests.

(1) The ERC will review and respond by letter to all scoping requests specifically made to the EPA. Although Federal Register Notices of Intent to prepare an EIS are not considered specific, the ERC is responsible for being aware of all relevant scoping requests and for participating in those of special interest to the EPA. Responses to these non-EPA specific scoping requests may be made by telephone, but a record of the communication must be kept in the official project file.

(2) Scoping letters can be either a form letter of acknowledgment with a list of generic concerns (related to project type or project area), or a letter with detailed action-specific comments. A generic scoping letter or telephone response must define EPA's anticipated level of participation in the scoping process and include at least the following information:

(a) For the general type of project being proposed:

1 A list of all EPA permits that might be required;

2 Significant environmental issues that should be emphasized in preparation of the EIS; and

3 References to publications, including guidelines and current research, that would be useful in analyzing the environmental impacts of various alternatives.

(b) A statement regarding EPA's intention to carry out its independent environmental review responsibilities under Section 309 of the Clean Air Act; and

(c) The name, title, and telephone number of the appropriate working-level contact in the EPA.

(3) The level of EPA participation in scoping processes will be determined by the ERC on a case-by-case basis, taking into account the following factors:

(a) EPA's statutory responsibility;

(b) Severity of potential environmental impacts;

(c) Priority concerns identified in the Administrator's Agency Operating Guidance; and

(d) Available staff and travel resources.

c. Input to the Scoping Process. For those scoping requests where the ERC determines that more substantive EPA participation is warranted, the generic information listed in subparagraph 3b(2) should be supplemented with further detailed guidance to the lead agency. Such guidance will, to the extent possible, include:

(1) Specific environmental issues that should be analyzed;

(2) Specific information or data related to the area of interest;

(3) Specific assessment techniques and methodologies that EPA program offices use or have approved for use;

(4) Reasonable alternatives to the proposed action that may avoid potential adverse impacts, including suggestions for an environmentally preferred alternative; and

(5) Mitigation measures that should be considered to reduce or substantially eliminate adverse environmental impacts.

4. EPA AS A COOPERATING AGENCY.

a. General. Under 40 CFR 1501.6, the lead agency may request any other Federal agency to serve as a cooperating agency if it has jurisdiction or special expertise (statutory responsibility, agency mission, or related program experience) regarding any environmental issue that should be addressed in the statement. EPA may also request that the lead agency designate it as a cooperating agency. The ERC is responsible for determining whether the EPA will become a cooperating agency. The ERC is encouraged to accept cooperating agency status as often as possible, taking into account the criteria in subparagraph 3b(3).

b. Responding to Requests To Be a Cooperating Agency.

(1) If EPA determines in response to a formal request or makes an independent request to be a cooperating agency, the ERC must inform the lead agency of this decision in writing. The response must clearly state that every effort will be made to raise and resolve issues during scoping and EIS preparation, but that EPA has independent obligations under Section 309 of the Clean Air Act to review and comment on every draft EIS. EPA's response to a request to become a cooperating agency should clearly outline EPA's role in the preparation of the EIS. EPA's participation may range from participation in the scoping process and reviewing the scope of work, any preliminary drafts, or technical documents to assuming responsibility for developing information, preparing environmental analyses, and actually drafting portions of the EIS.

(2) If the ERC determines that resource limitations preclude any involvement in the preparation of another agency's EIS, or preclude the degree of involvement requested by the lead agency, it must inform the lead agency in writing (40 CFR 1501.6(c)). The letter should clearly state that EPA's status as a cooperating agency does not affect its independent responsibilities under Section 309 of the Clean Air Act to review and comment on other agencies' EIS's. A copy of this reply will be submitted to the CEQ.

c. Providing Guidance as a Cooperating Agency. Information and/or guidance should be given to the lead agency in those areas where the EPA has special expertise as related to EPA's duties and responsibilities and in those subject areas described in subparagraph 3c. Specific guidance will be given in those areas where the EPA intends to exercise regulatory responsibility.

5. EPA AS LEAD AGENCY.

a. Determining Lead Agency. When, in accordance with 40 CFR Part 6, EPA has an action which is subject to 102(2)(C) of NEPA and the action involves another Federal agency, the ERC and the other Federal agency will determine the lead agency status in accordance with the guidance contained in 40 CFR 1501.5(c), taking into account any relevant Memorandum of Understanding which EPA has executed with the Federal agency in question. Selection of the lead agency should be made at the earliest possible time. If the EPA is the lead agency, EPA will not review the EIS under the Environmental Review Process.

6. REPORTING AND CONTROL. All responses related to scoping, cooperating, or lead agency issues, together with follow-up correspondence must be made a part of the official project file. Copies of letters in which EPA declines an agency's request to become a cooperating agency must be sent to the CEQ.

CHAPTER 4 - REVIEW OF DRAFT ENVIRONMENTAL IMPACT STATEMENTS

1. POLICY. It is EPA's policy to review and comment in writing on all draft EIS's officially filed with the EPA, to provide a rating of the draft EIS which summarizes EPA's level of concern, and to meet with the lead agency to resolve significant issues. The EPA review will be primarily concerned with identifying and recommending corrective action for the significant environmental impacts associated with the proposal. Review of the adequacy of the information and analysis contained in the draft EIS's will be done as needed to support this objective.

2. DRAFT EIS REVIEW MANAGEMENT. Except as noted below, the review management procedures and responsibilities given in chapter 2 apply to the review of draft EIS's.

a. Establishing Deadlines and Time Extensions.

(1) Deadlines. Unless a different deadline is officially established for receiving comments, EPA will provide comments on a draft EIS to the lead agency within 45 days from the start of the official review period. The official EIS due dates are listed in COMDATE. The PR will set internal deadlines to ensure EPA's comments are received within the official comment period.

(2) Time Extensions. Requests for extensions of review periods on draft EIS's should be kept to a minimum. In general, review period extensions on draft EIS's should not be requested unless important environmental issues are involved, and detailed substantive comments are being prepared. Time extensions should normally not exceed 15 days.

b. Categorization and Agency Notification System for Draft EIS's.

(1) After completing the review of a draft EIS, the PR will categorize or "rate" the EIS according to the alpha numeric system described below and in paragraph 4 of this chapter, and include the designated rating in the comment letter. In general, the rating will be based on the lead agency's preferred alternative. If, however, a preferred alternative is not identified, or if the preferred alternative has significant environmental problems that could be avoided by selection of another alternative, or if there is reason to believe that the preferred alternative may be changed at a later stage, the reviewer should rate individual alternatives. The purpose of the rating system is to synthesize the level of EPA's overall concern with the proposal and to define the associated follow-up that will be conducted with the lead agency.

(2) The alphabetical categories LO, EC, EO, and EU signify EPA's evaluation of the environmental impacts of the proposal. Numerical categories 1, 2, and 3 signify an evaluation of the adequacy of the draft EIS. A summary of the rating definitions and the associated follow-up action is given in

figure 4-1 at the end of this chapter. This figure should be attached to draft EIS comment letters when the lead agency may be unfamiliar with the EPA rating system. To the maximum extent possible, assignments of the alphabetical rating will be based on the overall environmental impact of the proposed project or action, including those project impacts that are not adequately addressed in the draft EIS. When there is insufficient information in the draft EIS, the determination of potential project impact may be based on other documents, information, or on-site surveys. The comment letter should clearly identify the source of information used by the EPA in evaluating the proposal.

(3) The rating of a draft EIS will consist of one of the category combinations shown in the table below. As noted in the table and described in chapter 5, the ERC must follow up with the lead agency in those cases where significant problem areas are identified.

Category	Lead Agency Pre-Notification	Follow-up on Draft EIS Comment Letter
LO	None	None
EC-1, EC-2	None	Phone Call
EO-1, EO-2	Phone call	Meeting
EO-3, EU-1, EU-2, EU-3, 3	Meeting	Meeting

(4) For categories EO, EU, or 3, the ERC will ensure that the lead agency is notified of the general EPA concerns prior to receipt of EPA's comment letter. For categories EU and 3, the ERC must attempt to meet with the lead agency to discuss EPA's concerns prior to submission of the comment letter to the lead agency. The purposes of such a meeting are to describe the specific EPA concerns and discuss ways to resolve those concerns, to ensure that the EPA review has correctly interpreted the proposal and supporting information, and to become aware of any ongoing lead agency actions that might resolve the EPA concerns. To assure the objectivity and independence of the EPA review responsibility, the EPA comment letter itself and the assigned rating are not subject to negotiation and should not be changed on the basis of the meeting unless errors are discovered in EPA's understanding of the issues. However, the reviewer may add in the letter an acknowledgment of any relevant new lead agency activities that the reviewer believes could resolve the EPA concerns.

3. SCOPE OF COMMENTS ON THE DRAFT EIS.

a. General. In general, EPA's comments will focus on the proposal but will, if necessary, review the complete range of alternatives, identifying those that are environmentally unacceptable to EPA and identifying EPA's preferred alternative. EPA's comment letter on the draft EIS will reflect all of EPA's environmental responsibilities that may bear on the action. The review will include EPA's assessment of the expected environmental impacts of the action and, if substantive impacts are identified, an evaluation of the adequacy of the supporting information presented in the EIS with suggestions for additional information that is needed. The EPA comment letter on draft EIS's will:

(1) Explicitly reference EPA's review responsibilities under NEPA/ Section 309;

(2) Acknowledge positive lead agency responses to EPA scoping suggestions or early coordination efforts;

(3) Provide a clear and concise description of EPA's substantive concerns and recommendations with supporting details given in attachments;

(4) Include a rating of the proposal and, if appropriate, the adequacy of the EIS in accordance with the criteria established in paragraphs 2 and 4 of this chapter; and

(5) Give the name and phone number of an appropriate EPA contact person.

b. Mitigation (40 CFR 1508.20). EPA's comments should include measures to avoid or minimize damage to the environment, or to protect, restore, and enhance the environment. Suggestions for mitigation should be oriented towards selection of mitigation measures that are technically feasible, of long-term effectiveness, and have a high likelihood of being implemented.

c. Statutory Authorities. Special efforts should be made to identify project impacts that may lead to possible violation of national environmental standards or that might preclude or bias future issuance of EPA related environmental permits. EPA comments regarding potential violations of standards must be clearly stated in the letter, and an offer should be made to work with the proposing agency to develop appropriate measures to reduce impacts.

d. Alternatives. If significant impacts are associated with the proposal and they cannot be adequately mitigated, EPA's comments should suggest an environmentally preferable alternative, including if necessary, a new alternative. The suggested alternatives should be both "reasonable" and "feasible." In this context, such an alternative is one that is practical in the technical, economic, and social sense, even if the alternative is outside the jurisdiction of the lead agency.

e. Purpose and Need. If a detailed review of alternatives is required, the reviewer may have to address the purpose of and need for the proposed action in order to determine to what degree an alternative would meet project objectives. In these cases, the reviewer may comment on the technical adequacy and accuracy of the EIS's methods for estimating the need for the proposed action in cases where this affects the definition of reasonable and feasible alternatives. Within the context of reviewing purpose and need, the EPA may also comment on the economic justification of the project, and the relationship between the lead agency's economic analysis and any unquantified environmental impacts, values, and amenities. The comments may also address the technical validity and adequacy of the supporting data for the EIS's economic analyses.

f. Projects Subject to Section 404(r) of the Clean Water Act. The Section 404 Coordinator will serve as an associate reviewer for those projects for which an agency is seeking an exemption under Section 404(r), and shall concur with the EPA comment letter. Section 404(r) provides that discharges of dredged or fill material which are part of Federal construction projects specifically authorized by Congress are not subject to regulation under Sections 301, 402, or 404 of the Clean Water Act if the information on the effects of such discharge including consideration of the Section 404(b)(1) Guidelines, is included in the EIS for the project, and the EIS has been submitted to Congress before the discharge occurs and before the authorization for the project occurs. In accordance with the CEQ's guidance of November 17, 1980, EPA's comments on the EIS will serve as the vehicle for informing the agency of EPA's determination whether the proposed Section 404(r) exemption will be in compliance with the requirements of the Section 404(b)(1) Guidelines. The comments should reference the CEQ Memorandum for Heads of Agencies, which provides guidance on applying Section 404(r) and should include EPA's determination regarding:

(1) Whether the EIS contains requisite information on the proposed discharges and other effects; and

(2) Whether the proposal is consistent with Section 404(b)(1) Guidelines.

g. Projects Potentially Affecting a Designated "Sole Source" Aquifer Subject to Section 1424(e) of the Safe Drinking Water Act.

(1) The regional office responsible for implementing the Safe Drinking Water Act (SDWA) will act as an AR on any EIS for a project potentially affecting a "sole source" aquifer designated under Section 1424(e) of the SDWA. EPA's comments on the draft EIS will serve as EPA's preliminary comments for the groundwater impact evaluation required under Section 1424(e), which stipulates that no commitment to a project of Federal financial assistance may be made, if the Administrator determines that a project has the potential to contaminate a designated aquifer, so as to create a significant hazard to public health. (Rules proposed to implement 1424(e) are found at 42 FR 51620, September 29, 1977.)

(2) If it is determined that a project may contaminate the aquifer through the recharge zone so as to create a significant hazard to public health the ERC will, in consultation with the drinking water staff, prepare a briefing memorandum and comment letter for the Regional Administrator. Copies of the briefing memorandum and the proposed comment letter shall first be sent to the appropriate FAL, who will coordinate concurrence by the Headquarters Office of Drinking Water. The comment letter should cite EPA's authorities under Section

309/NEPA and Section 1424(e) of SDWA, and state that the project is a candidate for both referral to the CEQ and a Section 1424(e) determination.

4. RATING SYSTEM CRITERIA.

a. Rating the Environmental Impact of the Action.

(1) LO (Lack of Objections). The review has not identified any potential environmental impacts requiring substantive changes to the preferred alternative. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposed action.

(2) EC (Environmental Concerns). The review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact.

(3) EO (Environmental Objections). The review has identified significant environmental impacts that should be avoided in order to adequately protect the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). The basis for environmental objections can include situations:

(a) Where an action might violate or be inconsistent with achievement or maintenance of a national environmental standard;

(b) Where the Federal agency violates its own substantive environmental requirements that relate to EPA's areas of jurisdiction or expertise;

(c) Where there is a violation of an EPA policy declaration;

(d) Where there are no applicable standards or where applicable standards will not be violated but there is potential for significant environmental degradation that could be corrected by project modification or other feasible alternatives; or

(e) Where proceeding with the proposed action would set a precedent for future actions that collectively could result in significant environmental impacts.

(4) EU (Environmentally Unsatisfactory). The review has identified adverse environmental impacts that are of sufficient magnitude that EPA believes the proposed action must not proceed as proposed. The basis for an environmentally unsatisfactory determination consists of identification of

environmentally objectionable impacts as defined above and one or more of the following conditions:

(a) The potential violation of or inconsistency with a national environmental standard is substantive and/or will occur on a long-term basis;

(b) There are no applicable standards but the severity, duration, or geographical scope of the impacts associated with the proposed action warrant special attention; or

(c) The potential environmental impacts resulting from the proposed action are of national importance because of the threat to national environmental resources or to environmental policies.

b. Adequacy of the Impact Statement.

(1) "1" (Adequate). The draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

(2) "2" (Insufficient Information). The draft EIS does not contain sufficient information to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the proposal. The identified additional information, data, analyses, or discussion should be included in the final EIS.

(3) "3" (Inadequate). The draft EIS does not adequately assess the potentially significant environmental impacts of the proposal, or the reviewer has identified new, reasonably available, alternatives, that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. The identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. This rating indicates EPA's belief that the draft EIS does not meet the purposes of NEPA and/or the Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS.

5. APPROVING AND DISTRIBUTING COMMENTS ON DRAFT EIS'S.

a. Categories LO, EC, EO, 1, or 2. For draft EIS's rated LO, EC, EO, 1, or 2 the comments will be signed by the appropriate regional or Headquarters official and the ERC will distribute EPA's comments in accordance with subparagraph 5c of this chapter.

b. Categories EU or 3. For draft EIS's where the ERC is proposing a rating of EU or 3, the EPA comment letter must be cleared by the Assistant Administrator for External Affairs prior to release. If the review is a regional action, the draft letter will be submitted through the OFA for clearance. The draft comment letter must be submitted at least 5 working days prior to the due date and the proposed rating must have been approved by the regional signing official. In every case where a draft statement has been rated EU or 3, the Assistant Administrator, OEA, will send a copy of the EPA comment letter to the CEQ. In addition, where the EPA has commented to a regional office of the originating agency, appropriate officials within the headquarters office of the originating agency will also be informed. If a communications strategy has been developed for the action, the release of information should follow that strategy.

c. Checklist for Distribution of Agency Comments on the Draft EIS.*

Addressee	Number of Copies
Agency submitting statement	Original
CEQ (if EU or 3) with transmittal letter	1 copy
Office of Public Affairs (if comments are rated EU or 3)	1 copy
EPA offices which served as associate reviewers	1 copy
Office of Federal Activities Attn: MIU	2 copies

6. REPORTING AND CONTROL. All draft EIS's under review, all time extensions, and all comment letters on draft EIS's will be entered in the MIU data management system. All EPA comment letters and associated correspondence on draft EIS's will be retained in the official project file.

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*To the maximum extent practicable, the comment letter should not be distributed to parties outside of the EPA until after the original has been received by the lead agency.

SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION*

Environmental Impact of the Action

LO--Lack of Objections
The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC--Environmental Concerns
The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO--Environmental Objections
The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alterna tive or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU--Environmentally Unsatisfactory
The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1--Adequate
EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2--Insufficient Information
The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3--Inadequate
EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

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*From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment.

Figure 4-1

CHAPTER 5 - POST-DRAFT EIS FOLLOW-UP

1. POLICY. It is EPA's policy to conduct follow-up discussions with the lead agency to ensure that EPA's concerns raised at the draft EIS stage are fully understood and considered by the lead agency. To the extent resources allow, follow-up efforts should exceed the minimum required by this chapter and paragraph 2b(3) of chapter 4.

2. POST-DRAFT CONSULTATIONS. In cases where a draft EIS is rated EO, EU, or 3, the ERC must initiate consultation with the lead agency. Agency consultation will continue at increasing levels of management, through the EPA Assistant Administrator level, as appropriate, until EPA's concerns are resolved or further negotiations are pointless. For those actions where the region is the PR, the ERC will work through the appropriate FAL to coordinate the consultation efforts at the regional and Headquarters levels. The ERC and/or FAL should be prepared to review the project in the field, to develop additional information, and/or to work with the agency to improve the proposed action and the supporting final EIS. When substantive consultation meetings are held, the ERC must document the outcome and, as appropriate, respond in writing to the lead agency to acknowledge any points of agreement, and to restate any unresolved issues.

3. STATUS REPORTS.

a. After consulting or meeting with the lead agency concerning draft EIS's rated EU or 3, the ERC will prepare a status memorandum for the Assistant Administrator, OEA, through the Director, OFA, and, if it is a regional action, for the Regional Administrator. This memorandum should summarize: (1) the progress of the consultations; (2) the remaining unresolved issues; (3) the positions of other affected Federal agencies; and (4) a prognosis for the resolution of remaining issues.

b. The ERC will periodically assess the lead agency's progress in responding to EPA's concerns on draft EIS's rated EU or 3. It is the ERC's responsibility to anticipate, and make early preparation for, those final EIS's which will be so unresponsive to EPA's concerns that a recommendation for referral of the final EIS to the CEQ will be required.

4. REPORTING AND CONTROL. All correspondence regarding post-draft consultations and agreements must be retained in the official project file. For all draft EIS's which have been rated EU or 3, the official file must also contain all material that may be needed for a formal referral package.

CHAPTER 6 - REVIEW OF FINAL EIS'S

1. POLICY. It is EPA's policy to conduct detailed reviews of those final EIS's which had significant issues raised by the EPA at the draft EIS stage. Each final EIS will be checked to determine whether the statement adequately resolves the problems identified in the EPA review of the draft EIS, or whether there has been a substantive change in the proposal. A detailed review and submission of comments on the final EIS will be done for those actions rated EO, EU, or 3 at the draft stage. A detailed review on other final EIS's may be done if the ERC determines that conditions warrant it.

2. FINAL EIS REVIEW MANAGEMENT. Except as noted below, the review management procedures and responsibilities given in chapter 2 apply to the review of final EIS's.

a. Designating Lead Responsibility and Principal and Associate Reviewers. Lead responsibility for the final EIS will be the same as for the draft EIS unless other arrangements have been made with the MIU. If possible, the same principal and associate reviewers who dealt with the draft EIS will be assigned to review the final EIS.

b. Establishing Deadlines and Time Extensions.

(1) Deadlines. Unless a different deadline is officially established for receiving comments, EPA will respond to a final EIS within 30 days from the start of the official review period. The official EIS due dates are listed in COMDATE. The PR will set internal deadlines to ensure EPA's comments are received within the official comment period. All final EIS's which are candidates for referral to the CEQ, will be given priority review in accordance with the internal deadlines specified in chapter 9.

(2) Time Extensions. Requests for extensions of review periods on final EIS's should be kept to a minimum. In general, review period extensions on final EIS's should not be requested unless important environmental issues are involved and detailed substantive comments are being prepared. Time extensions should normally not exceed 15 days. Time extensions for a referral deadline will be requested in accordance with the procedures in chapter 9.

c. Categorizing Final EIS's. The alpha numeric rating system used for draft EIS's will be applied to final EIS's for internal management purposes only (see chapter 4, paragraph 4). The EPA rating is not to be included in comment letters on final EIS's. Instead, the comments will rely wholly on narrative explanations to describe the environmental impact of the proposed action or the responsiveness or unresponsiveness of the EIS. The PR will include the assigned rating when entering the action into the MIU data management system.

3. SCOPE OF COMMENTS ON FINAL EIS'S.

a. General.

(1) Except in unusual circumstances, the review of final EIS's will be directed to the major unresolved issues, focusing on the impacts of the project rather than on the adequacy of the statement. Except in unusual circumstances, the scope of review will be limited to issues raised in EPA's comments on the draft EIS that have not been resolved in the final EIS, and any new, potentially significant impacts that have been identified as a result of information made available after publication of the draft EIS.

(2) Within 5 days after the start of the review period for the final EIS, the PR will make a preliminary determination as to whether the action meets the criteria for "environmentally unsatisfactory" as set forth in chapter 4, paragraph 4 of this Manual. If the action is determined to be environmentally unsatisfactory, the procedures set forth in chapter 9 of this Manual will be followed.

(3) For final EIS's which had drafts categorized as LO, the PR may decide that no formal comments on the final EIS will be submitted to the lead agency. Written comments will be prepared in other cases and when the agency has made substantive modifications in the proposed action in comparison to the draft EIS. In addition, written comments will be prepared for final EIS's that involve Section 404(r) or Section 1424(e) issues.

(4) In those cases involving significant mitigation requirements or where the proposed agency action is not clear, EPA's comments on the final EIS will also include a request for a copy of the Record of Decision.

b. Mitigation Measures. If a final EIS identifies for the first time, or modifies the agency's preferred alternative, EPA's review should include consideration of any additional specific mitigation measures necessary to reduce any adverse impacts of that alternative. When mitigation measures are recommended, the comment letter should suggest that the lead agency include these measures in their Record of Decision as specific conditions on their permits or grants. Where mitigation measures are directly related to the acceptability of the action, the comment letter should include a request that the lead agency keep EPA informed of progress in carrying out the mitigation measures proposed by the EPA.

c. Projects Under Section 404(r) of the Clean Water Act.

(1) The Section 404 Coordinator will serve as an associate reviewer on all final EIS's involving a potential 404 permit. In order to satisfy the provisions of Section 404(r), the EIS process must be completed before Congress approves requests for authorizations and appropriations. Pursuant to the CEQ Memorandum for Heads of Agencies, November 17, 1980, completion of the EIS process includes resolution of any pre-decision referrals.

(2) The comment letter on a final EIS seeking a 404(r) exemption will include EPA's determination regarding: (a) whether the EIS contains requisite information on the proposed discharges and other effects, and (b) whether the proposal is consistent with the 404(b)(1) Guidelines.

(3) If a negative determination on either (2)(a) or (b) is made, the appropriate FAL will be informed and will coordinate with the lead agency to ensure that the required statement of EPA's determination is included in the lead agency's congressional submission. The FAL will also ensure that EPA's views regarding an exemption are effectively represented in the Office of Management and Budget's (OMB's) legislative and budget processes.

d. Projects Subject to Groundwater Evaluation Under Section 1424(e) of the SDWA.

(1) The regional drinking water program staff will serve as an AR on the review of any EIS for a project potentially affecting a designated "sole source" aquifer and will be responsible for the preliminary determination of project compliance with the requirements of Section 1424(e) of the SDWA.

(2) If the regional drinking water program staff determines that a project may contaminate the aquifer through the recharge zone so as to create a significant hazard to public health, the ERC will, in consultation with the regional drinking water staff and appropriate Headquarters FAL, prepare a briefing memorandum and comment letter for the Regional Administrator. Upon approval, the Regional Administrator shall submit the package to the Director, OFA, who shall coordinate the appropriate Headquarters approval and submission to the Administrator for action.

4. UNRESPONSIVE FINAL EIS.

(1) If the lead agency prepares a final EIS rather than a supplement or revised draft EIS in response to an EPA "3" rating, or if there are significant new circumstances or information relevant to areas of significant environmental impact, the review should follow the procedures of chapter 4 to determine if the proposal is either "environmentally unsatisfactory" or "inadequate." If it is determined that either of these situations apply, the procedures of chapter 9 should be initiated to determine if a referral of the proposal to the CEQ is warranted.

(2) If a refferal is not warranted, but the EIS contains insufficient information to assess potentially significant environmental impacts of the proposed action, a request should be made for the agency to prepare a supplemental EIS. In such cases, the EPA comment letter must demonstrate that the final EIS is unresponsive to EPA's comments on the draft EIS and state EPA's belief that the final EIS is inadequate to meet the purposes of the NEPA and/or the EPA review, and therefore should be formally supplemented (40 CFR 1502.9(c)).

5. **DISTRIBUTION OF THE FINAL EIS COMMENT LETTER.** The ERC will coordinate distribution of the final EIS comment letter in accordance with chapter 4, paragraph 5 of this Manual (or in the case of a referral, chapter 9, paragraph 5) and any applicable communications strategy. To the maximum extent practicable, the comment letter will not be distributed externally until after the lead agency has received the original.

6. **REPORTING AND CONTROL.** All final EIS's, comment letters, no comment memoranda, and correspondence related to time extensions will be entered in the MIU data management system and retained in the official project file. The final EIS rating must also be entered into the MIU system (even if no comment letter was sent).

CHAPTER 7 - MONITORING AND FOLLOW-UP

1. POLICY. It is EPA's policy to conduct, on a selected basis, follow-up activities on comments on final EIS's to ensure that: (1) the EPA participates as fully as possible in any post-EIS efforts designed to assist agency decisionmaking; (2) agreed upon mitigation measures are identified in the Record of Decision; and (3) the agreed upon mitigation measures are fully implemented (e.g., permit conditions, operating plan stipulations, etc.).

2. MONITORING AND FOLLOW-UP.

a. After transmittal of EPA's comments on the final EIS, the PR will, as appropriate, ensure that:

(1) EPA receives a copy of the Record of Decision;

(2) The lead agency has incorporated into the Record of Decision all agreed upon mitigation and other impact reduction measures; and

(3) The lead agency has included all agreed upon measures as conditions in grants, permits, or other approvals, where appropriate.

b. Officials who could be subsequently involved in the proposed action should be informed of the final EPA position on the EIS (e.g., regional or State enforcement officials for NPDES permitting, regional enforcement officials for Section 404 enforcement, regional air program or enforcement officials for transportation control strategy compliance and State implementation plan requirements).

c. Where resources allow, the ERC is encouraged to assess the level of compliance and effectiveness of Federal agency mitigation measures. The ERC is responsible for determining when and how EPA's final EIS follow-up and monitoring should be carried out.

3. REVIEW OF THE RECORD OF DECISION.

a. The PR should review the Record of Decision on all final EIS's on which the EPA has expressed environmental objections, and/or those where the EPA has negotiated mitigation measures or changes in project design.

b. The ERC will bring problems or discrepancies between the Record of Decision and agreed upon mitigation measures to the attention of the lead agency. Any unresolved issues should be coordinated with the appropriate FAL, and, through the FAL, with the lead agency's headquarters office, and if appropriate, with the CEQ.

4. REPORTING AND CONTROL. All correspondence regarding the Record of Decision will be recorded in the official project file.

CHAPTER 8 - REVIEW OF DOCUMENTS OTHER THAN EIS'S

1. POLICY. The Environmental Review Process will include review of those proposed Federal agency actions, legislation, regulations, and notices which may not be contained in an EIS, but which could lead to or have significant environmental impacts.

2. GENERAL REVIEW PROCEDURES.

a. Lead Responsibility for Review of Other Actions. Lead responsibilities for non-EIS actions are, in general, as defined below but may be adjusted in accordance with the procedures in chapter 2 of this Manual.

(1) The OFA will have lead responsibility on all regulation reviews and the appropriate FAL will determine which proposed regulations should be reviewed;

(2) The Office of Legislative Analysis (OLA), within the Office of External Affairs, will have lead responsibility on all non-EIS legislation reviews and will determine when the EPA will prepare formal comments on legislation; and

(3) Overall management of the review of non-EIS agency actions, including environmental assessments and Findings of No Significant Impact (FONSI's), license applications, etc., is the responsibility of the ERC managing the liaison activity that involves the action.

b. Conducting Reviews of Other Actions. The ERC will follow the review coordination procedures of chapter 2 to ensure that EPA's comments are coordinated and comprehensive and are received by the originating agency within its decisionmaking period. If the ERC believes that an EIS is needed on the proposed action, the procedures found in paragraph 6 of this chapter should be followed.

c. Rating Other Federal Actions. Except for the referral criteria, the rating system for draft impact statements pursuant to chapter 4 of this Manual will not be used for non-EIS actions. If the PR determines that a Federal agency action covered by this chapter is environmentally unsatisfactory in accordance with the criteria listed in chapter 4, thus warranting a referral to the CEQ, then the procedures found in paragraph 7 of this chapter will apply.

3. LEGISLATION REVIEWS. The OLA has lead responsibility on all proposed legislation not accompanied by an EIS. The OLA is responsible for coordinating with other EPA program and regional offices, and for preparing EPA's comments on all legislation. Any ERC receiving proposed legislation from another Federal agency should forward it directly to the OLA for action.

4. REGULATION REVIEWS. The FAL's will monitor the Federal Register regularly to determine which environmental regulations proposed by their assigned Federal agencies are significant and should be reviewed. FAL's will normally act as PR's for regulations proposed by the agencies assigned to them. The Director, OFA, will be the signatory official for comments on these regulations. The FAL will be responsible for ensuring that the regions and EPA program offices impacted by the regulations will be designated as AR's.

5. OTHER AGENCY ACTION REVIEWS. The ERC may determine that other non-EIS Federal actions such as environmental assessments (40 CFR 1508.9), FONSI's (40 CFR 1508.13), issue papers, or technical support documents should be reviewed. The ERC's decision to review these actions will take into account the relationship of the proposed action to other Federal actions and how the document fits into the overall decisionmaking process.

6. DETERMINING THE NEED FOR AN EIS. Whenever the ERC determines on the basis of investigating a public inquiry, reviewing a regulation or environmental assessment/FONSI, or by other means, that a Federal agency has not or does not intend to prepare an EIS on an action that the EPA believes could significantly affect the quality of the human environment, the following procedures pertain.

a. If it is a regional action, the ERC will immediately contact the appropriate FAL and develop a coordinated regional/headquarters approach for working with the lead agency.

b. The ERC will initiate consultation with the Federal agency responsible for the major action to explore the necessity for EIS preparation. Discussions with the agency will be couched in terms of suggested action for the Federal agency's consideration rather than as an EPA requirement. It is the lead agency's responsibility to decide if an EIS will be prepared.

c. If, after such consultation, the ERC believes that the requirements of Section 102(2)(C) of NEPA are applicable, the PR will prepare a comment letter to the Federal agency responsible for the proposed action. The comment letter should include EPA's assessment of the action and reasons why the EPA believes the agency should prepare an EIS.

7. ENVIRONMENTALLY UNSATISFACTORY ACTIONS. If the ERC determines that a non-EIS action is environmentally unsatisfactory at the draft stage (in accordance with the EU criteria specified in chapter 4), the proposed comment letter must be cleared by the Assistant Administrator, OEA, prior to release. The procedures of chapter 4 must be followed in obtaining this clearance. At the time of the clearance request, or if the non-EIS action is a final action, the ERC and/or appropriate FAL will set up internal consultation and referral procedures similar to those outlined in chapter 9 of this Manual. The procedures will also consider the option of requesting an EIS. The procedures will ensure that the referral will take place no later than 5 days before the "final" lead agency action. For example, in the case of proposed regulations, the referral must occur prior to publication of the final rule.

8. REPORTING AND CONTROL. Regulations under review and the resulting comment letters, as well as comment letters on any other non-EIS action determined to be environmentally unsatisfactory, will be entered into the MIU data management system. All agency comment letters and official agency actions related to the Environmental Review Process will be retained in the official project file.

CHAPTER 9 - REFERRALS TO THE COUNCIL ON ENVIRONMENTAL QUALITY

1. POLICY. The EPA authority for referring proposed regulations or major Federal actions to the Council on Environmental Quality (40 CFR 1504 and Section 309 of the Clean Air Act) will be used only when significant environmental issues are involved and only after every effort to resolve these issues at the agency level has been exhausted.

2. CRITERIA FOR REFERRAL. In order to meet a determination of "unsatisfactory from the standpoint of public health or welfare or environmental quality," the proposed action must satisfy the "environmentally unsatisfactory" criteria given in chapter 4.

3. REFERRAL PROCEDURES.

a. The CEQ has established a 25-day time period, starting from the date of the Notice of Availability of the final EIS in the Federal Register, for referring final EIS's (40 CFR 1504.3(b)). Extensions of EIS referral periods can be granted only by the lead agency (40 CFR 1504.3(b)) and must be specific to the 25-day referral period rather than the overall comment period.

b. Since EPA has authority under Section 309 of the Clean Air Act to refer proposed regulations and major Federal actions for which no EIS has been prepared, the intent of the 25-day deadline is incorporated in the procedures of this section by requiring all EPA referrals to be made no later than 5 days before the end of the comment period or, in any case, 5 days before the final action takes place.

4. REFERRAL PACKAGE DEVELOPMENT SEQUENCE.

a. The objective of the referral package development sequence requirements in this section is to ensure that the referral package is ready within the rigid 25-day time limit and, simultaneously, allow for a final attempt to resolve EPA's concerns with the lead agency. The key elements in this sequence are:

(1) Early identification of the potential referral action by the PR/ERC;

(2) Approval of the referral action by the Regional Administrator (if a regional action) and the Assistant Administrator, OEA;

(3) An attempt to meet with the lead agency and work out EPA's concerns; and

(4) Preparation of the referral package to preserve the referral option if discussions with the lead agency do not resolve EPA's concerns.

b. Specific procedures for the referral development sequence are described below. To facilitate this description, it is assumed that the referral action is taken by a region. The same procedures apply where Headquarters has the referral action except there would be no regional requirements.

(1) Within 5 days after the beginning of the review period the PR, in consultation with the ERC, will make a preliminary determination as to whether the action is unsatisfactory from the standpoint of public health, welfare, or environmental quality in accordance with the EU criteria in chapter 4. If a referral is indicated, the ERC will notify the appropriate FAL and proceed with development of the materials described below.

(2) Within 10 days from the start of the 25-day referral period, the ERC, in consultation with the FAL, will prepare and submit to the Regional Administrator and the Assistant Administrator, OEA, through the Director, OFA, a briefing memorandum and interim response to the lead agency. The interim response will state that the EPA is considering a referral to the CEQ and will request a meeting and time extension to allow for a resolution of EPA's concerns. The briefing memorandum will contain the following information:

(a) Brief description of the proposed action;

(b) Reason the action is environmentally unsatisfactory;

(c) Description of the attempts to resolve differences with the lead agency;

(d) Positions of other affected Federal agencies, groups, and public officials; and

(e) Recommended strategy for resolution of remaining issues.

(3) If the lead agency grants a time extension, EPA negotiations will take place and, if necessary, the referral package will be developed according to the extended referral time period. If the lead agency grants a time extension of the referral period by phone, the ERC will immediately prepare a letter to the lead agency documenting the agreement. If a time extension is not granted, the referral preparation will proceed on the basis of the original referral deadline.

(4) No later than 10 days before the referral deadline, the FAL will prepare a short information memorandum for the Administrator describing potential referral and the status of unresolved issues; a one-page "talking points" paper; and an outline of a communication strategy for notifying all interested groups of EPA's action. Development of the communication strategy is to be coordinated with the immediate Office of the Assistant Administrator for External Affairs.

(5) No later than 7 days before the referral deadline, the final referral package, prepared in accordance with paragraph 6 of this chapter and approved by the Regional Administrator, will be forwarded to the Director, OFA.

(6) No later than 5 days before the referral deadline, the Director, OFA, will ensure that the referral package is in final form with all letters and appropriate concurrences ready for the Administrator's signature, and working through the Assistant Administrator for OEA, to ensure that a briefing has been arranged for the Administrator.

5. CONTENT AND ORGANIZATION OF THE REFERRAL PACKAGES.

a. Administrator's Referral Package. The referral package for the Administrator will include the package to be submitted to the CEQ and the lead agency, and the following:

(1) An action memorandum to the Administrator (not to exceed two pages) briefly outlining the proposed action, EPA's concerns with the proposed action, and positions of other affected Federal agencies, public interest groups, and congressional delegations.

(2) A communications strategy for notifying all interested groups of the referral. This strategy will be coordinated with the immediate Office of the Assistant Administrator for External Affairs and will follow the established strategy development format.

b. CEQ Referral Package. The CEQ referral package will consist of a letter for the Administrator's signature to the Chairman of the CEQ setting forth the basis of EPA's determination and the lead agency referral package described below.

c. Lead Agency Referral Package. This package will consist of the following:

(1) A letter for the Administrator's signature to the head of the lead agency informing the lead agency of EPA's unsatisfactory determination, and of the referral of the matter to the CEQ. The letter should request that no action be taken on the proposed action until the CEQ acts on the matter.

(2) Detailed comments supporting EPA's conclusion that the matter is unsatisfactory from the standpoint of public health, welfare, or environmental quality. The detailed comments will include the following information:

(a) The unacceptable impacts related to EPA's areas of jurisdiction or expertise;

(b) The reasons EPA believes the matter is unsatisfactory;

(c) Description of those national resources or environmental policies that would be adversely affected;

(d) Identification of environmentally preferable alternatives;

(e) Identification of agreed upon facts;

(f) Identification of material facts in controversy; and

(g) Brief review of attempts by the EPA to resolve the concerns with the lead agency.

6. APPROVING AND DISTRIBUTING THE REFERRAL PACKAGE. After the Administrator signs the referral comment letters to the lead agency and to the CEQ, the letters will be hand-carried to the addressees. The appropriate FAL will then ensure follow-up distribution of the CEQ referral package as follows and/or in accordance with the communications strategy:

Addressee	Number of Copies
Lead agency	3 copies
CEQ	4 copies
EPA Administrator	2 copies
Assistant Administrator, OEA	2 copies
Headquarters Office of Public Affairs	2 copies
Appropriate regional office	3 copies
Appropriate regional Office of Public Affairs	2 copies
Director, OFA	1 copy
Management Information Unit, OFA	1 copy
EPA offices which served as associate reviewers	1 copy
Appropriate elected officials	Determined by the Office of Congressional Liaison

7. REPORTING AND CONTROL.

The referral package, all related correspondence, and documentation of time extensions will be retained in the official project file. Time extensions will be entered into the MIU data management system.

the Agency to defray the costs of use by outside groups or individuals.

(b) Rules and regulations

The Administrator may promulgate regulations to cover such use of Agency facilities in accordance with generally accepted accounting, safety, and laboratory practices.

(c) Waiver of reimbursement by Administrator

When he finds it is in the public interest the Administrator may waive reimbursement or fees for outside use of Agency facilities by nonprofit private or public entities.

(Pub. L. 96-229, § 5, Apr. 7, 1980, 94 Stat. 328.)

CODIFICATION

Section was enacted as part of the Environmental Research, Development, and Demonstration Authorization Act of 1980, and not as part of the National Environmental Policy Act of 1969 which comprises this chapter.

CHAPTER 56—ENVIRONMENTAL QUALITY IMPROVEMENT

Sec.
4371. Congressional findings, declarations, and purposes.
4372. Office of Environmental Quality.
    (a) Establishment; Director; Deputy Director.
    (b) Compensation of Deputy Director.
    (c) Employment of personnel, experts, and consultants; compensation.
    (d) Duties and functions of Director.
    (e) Authority of Director to contract.
4373. Referral of Environmental Quality Reports to standing committees having jurisdiction.
4374. Authorization of appropriations.

§ 4371. Congressional findings, declarations, and purposes

(a) The Congress finds—

(1) that man has caused changes in the environment;

(2) that many of these changes may affect the relationship between man and his environment; and

(3) that population increases and urban concentration contribute directly to pollution and the degradation of our environment.

(b)(1) The Congress declares that there is a national policy for the environment which provides for the enhancement of environmental quality. This policy is evidenced by statutes heretofore enacted relating to the prevention, abatement, and control of environmental pollution, water and land resources, transportation, and economic and regional development.

(2) The primary responsibility for implementing this policy rests with State and local government.

(3) The Federal Government encourages and supports implementation of this policy through appropriate regional organizations established under existing law.

(c) The purposes of this chapter are—

(1) to assure that each Federal department and agency conducting or supporting public works activities which affect the environment shall implement the policies established under existing law; and

(2) to authorize an Office of Environmental Quality, which, notwithstanding any other provision of law, shall provide the professional and administrative staff for the Council on Environmental Quality established by Public Law 91-190.

(Pub. L. 91-224, title II, § 202, Apr. 3, 1970, 84 Stat. 114.)

REFERENCES IN TEXT

Pub. L. 91-190, referred to in subsec. (c)(2), is Pub. L. 91-190, Jan. 1, 1970, 83 Stat. 852, as amended, known as the National Environmental Policy Act of 1969, which is classified generally to chapter 55 (§ 4321 et seq.) of this title. For complete classification of this Act to the Code, see Short Title note set out under section 4321 of this title and Tables.

SHORT TITLE

Section 201 of Pub. L. 91-224 provided that: "This title [enacting this chapter] may be cited as the 'Environmental Quality Improvement Act of 1970'."

§ 4372. Office of Environmental Quality

(a) Establishment; Director; Deputy Director

There is established in the Executive Office of the President an office to be known as the Office of Environmental Quality (hereafter in this chapter referred to as the "Office"). The Chairman of the Council on Environmental Quality established by Public Law 91-190 shall be the Director of the Office. There shall be in the Office a Deputy Director who shall be appointed by the President, by and with the advice and consent of the Senate.

(b) Compensation of Deputy Director

The compensation of the Deputy Director shall be fixed by the President at a rate not in excess of the annual rate of compensation payable to the Deputy Director of the Office of Management and Budget.

(c) Employment of personnel, experts, and consultants; compensation

The Director is authorized to employ such officers and employees (including experts and consultants) as may be necessary to enable the Office to carry out its functions under this chapter and Public Law 91-190, except that he may employ no more than ten specialists and other experts without regard to the provisions of title 5, governing appointments in the competitive service, and pay such specialists and experts without regard to the provisions of chapter 51 and subchapter III of chapter 53 of such title relating to classification and General Schedule pay rates, but no such specialist or expert shall be paid at a rate in excess of the maximum rate for GS-18 of the General Schedule under section 5332 of title 5.

(d) Duties and functions of Director

In carrying out his functions the Director shall assist and advise the President on policies and programs of the Federal Government affecting environmental quality by—

(1) providing the professional and administrative staff and support for the Council on Environmental Quality established by Public Law 91-190.

(2) assisting the Federal agencies and departments in appraising the effectiveness of existing and proposed facilities, programs, policies, and activities of the Federal Government, and those specific major projects designated by the President which do not require individual project authorization by Congress, which affect environmental quality;

(3) reviewing the adequacy of existing systems for monitoring and predicting environmental changes in order to achieve effective coverage and efficient use of research facilities and other resources;

(4) promoting the advancement of scientific knowledge of the effects of actions and technology on the environment and encourage the development of the means to prevent or reduce adverse effects that endanger the health and well-being of man;

(5) assisting in coordinating among the Federal departments and agencies those programs and activities which affect, protect, and improve environmental quality;

(6) assisting the Federal departments and agencies in the development and interrelationship of environmental quality criteria and standards established through the Federal Government;

(7) collecting, collating, analyzing, and interpreting data and information on environmental quality, ecological research, and evaluation.

(e) Authority of Director to contract

The Director is authorized to contract with public or private agencies, institutions, and organizations and with individuals without regard to section 3324(a) and (b) of title 31 and section 5 of title 41 in carrying out his functions.

(Pub. L. 91-224, title II, § 203, Apr. 3, 1970, 84 Stat. 114; 1970 Reorg. Plan No. 2, § 102, eff. July 1, 1970, 35 F.R. 7959, 84 Stat. 2085.)

REFERENCES IN TEXT

Pub. L. 91-190, referred to in subsecs. (a), (c), (d), is Pub. L. 91-190, Jan. 1, 1970, 83 Stat. 852, as amended, known as the National Environmental Policy Act of 1969, which is classified generally to chapter 55 (§ 4321 et seq.) of this title. For complete classification of this Act to the Code, see Short Title note set out under section 4321 of this title and Tables.

The provisions of title 5, governing appointments in the competitive service, referred to in subsec. (c), are classified to section 3301 et seq. of Title 5, Government Organization and Employees.

The General Schedule, referred to in subsec. (c), is set out under section 5332 of Title 5.

CODIFICATION

In subsec. (e), "section 3324(a) and (b) of title 31" was substituted for reference to section 3648 of the Revised Statutes (31 U.S.C. 529) on authority of Pub. L. 97-258, § 4(b), Sept. 13, 1982, 96 Stat. 1067, the first section of which enacted Title 31, Money and Finance.

TRANSFER OF FUNCTIONS

All functions vested by law (including reorganization plan) in the Bureau of the Budget or the Director of the Bureau of the Budget were transferred to the President of the United States by section 101 of Reorg. Plan No. 2 of 1970, eff. July 1, 1970, 35 F.R. 7959, 84 Stat. 2085, set out in the Appendix to Title 5, Government Organization and Employees. Section 102 of Reorg. Plan No. 2 of 1970, redesignated the Bureau of the Budget as the Office of Management and Budget.

§ 4373. Referral of Environmental Quality Reports to standing committees having jurisdiction

Each Environmental Quality Report required by Public Law 91-190 shall, upon transmittal to Congress, be referred to each standing committee having jurisdiction over any part of the subject matter of the Report.

(Pub. L. 91-224, title II, § 204, Apr. 3, 1970, 84 Stat. 115.)

REFERENCES IN TEXT

Pub. L. 91-190, referred to in text, is Pub. L. 91-190, Jan. 1, 1970, 83 Stat. 852, as amended, known as the National Environmental Policy Act of 1969, which is classified generally to chapter 55 (§ 4321 et seq.) of this title. For complete classification of this Act to the Code, see Short Title note set out under section 4321 of this title and Tables.

§ 4374. Authorization of appropriations

There are hereby authorized to be appropriated for the operations of the Office of Environmental Quality and the Council on Environmental Quality not to exceed the following sums for the following fiscal years which sums are in addition to those contained in Public Law 91-190:

(a) $2,126,000 for the fiscal year ending September 30, 1979.

(b) $3,000,000 for each of the fiscal years ending September 30, 1980, and September 30, 1981.

(c) $44,000 for the fiscal years ending September 30, 1982, 1983, and 1984.

(Pub. L. 91-224, title II, § 205, Apr. 3, 1970, 84 Stat. 115; Pub. L. 93-36, May 18, 1973, 87 Stat. 72; Pub. L. 94-52, § 1, July 3, 1975, 89 Stat. 258; Pub. L. 94-298, May 29, 1976, 90 Stat. 587; Pub. L. 95-300, June 26, 1978, 92 Stat. 342; Pub. L. 97-350, § 1, Oct. 18, 1982, 96 Stat. 1661.)

REFERENCES IN TEXT

Pub. L. 91-190, referred to in text, is Pub. L. 91-190, Jan. 1, 1970, 83 Stat. 852, as amended, known as the National Environmental Policy Act of 1969, which is classified generally to chapter 55 (§ 4321 et seq.) of this title. For complete classification of this Act to the Code, see Short Title note set out under section 4321 of this title and Tables.

AMENDMENTS

1982—Cl. (c). Pub. L. 97-350 added cl. (c).

1978—Pub. L. 95-300 added cls. (a) and (b). Former cls. (a) to (d), which authorized appropriations of $2,000,000 for the fiscal year ending June 30, 1976, $500,000 for the transition period of July 1, 1976 to Sept. 30, 1976, $3,000,000 for the fiscal year ending Sept. 30, 1977, and $3,000,000 for the fiscal year ending Sept. 30, 1978, respectively, were struck out.

1976—Pub. L. 94-298 made changes in structure by designating existing provisions as cls. (a) and (b) and adding cls. (c) and (d).

1975—Pub. L. 94-52 substituted "$2,000,000 for the fiscal year ending June 30, 1976, and not to exceed $500,000 for the transition period (July 1, 1976 to September 30, 1976)" for "$1,500,000 for the fiscal year ending June 30, 1974, and $2,000,000 for the fiscal year ending June 30, 1975".

APPENDIX C

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